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PUBLIC UTILITIES COMMISSION

BEFORE THE

PUBLIC UTILITIES COMMISSION

OF THE STATE OF HAWAII

In the Matter of the Application of HAWAIIAN ELECTRIC COMPANY, INC. For Approval of Rate Increases and Revised Rate Schedules and Rules	)	DOCKET NO. 2006-0386

DIRECT TESTIMONY OF

STEPHEN G. HILL

ON BEHALF OF

THE UNITED STATES DEPARTMENT OF DEFENSE

AND

CERTIFICATE OF SERVICE

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DEPARTMENT OF DEFENSE

DOD T-2

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Direct Testimony of

Stephen G. Hill

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The United States Department of Defense

August 6, 2007

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Docket No. 2006-0386

Hawaiian Electric Company, Inc.

INTRODUCTION / SUMMARY

Q. PLEASE STATE YOUR NAME, OCCUPATION AND ADDRESS.

A. My name is Stephen G. Hill. I am self-employed as a financial consultant, and principal of Hill Associates, a consulting firm specializing in financial and economic issues in regulated industries. My business address is P.O. Box 587, Hurricane, West Virginia, 25526 (e-mail: hillassociates@gmail.com). A detailed account of my educational background and occupational experience appears in DOD 200, attached to this testimony.

Q. ON BEHALF OF WHOM ARE YOU TESTIFYING IN THIS PROCEEDING?

A. I am under contract with the Utility Rates and Studies Office of the U.S. Department of the Navy to perform utility cost of capital studies. The Navy represents the Department of Defense and all other Federal Executive Agencies (DOD) in certain defined geographical areas.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. In this testimony, I present the results of studies I have performed related to the appropriate return on equity to be applied to the electric utility operations of Hawaiian Electric Company (HECO, the Company), a subsidiary of Hawaiian Electric Industries, Inc. (HEI, the Parent). In addition to my testimony regarding the Company's current cost of equity capital for its electric generation operations, I review the cost of capital testimony provided by Dr. Roger Morin and discuss the shortcomings contained therein.

Q. HAVE YOU PREPARED EXHIBITS IN SUPPORT OF YOUR TESTIMONY?

A. Yes, Exhibits DOD 200 through DOD 203 contain additional detail regarding certain aspects of my narrative testimony in this proceeding. In addition, DOD 204 through DOD 215 provide the analytical support for the conclusions reached regarding the overall cost of capital for the integrated electric utility operations of HECO presented in the body of the testimony. These Exhibits were prepared by me and are correct to the best of my knowledge

and belief.

Q. PLEASE SUMMARIZE YOUR TESTIMONY AND FINDINGS CONCERNING THE RATE OF RETURN THAT SHOULD BE UTILIZED IN SETTING RATES FOR HECO's ELECTRIC UTILITY OPERATIONS IN THIS PROCEEDING.

A. My testimony is organized into five sections. First, I discuss objective indications regarding current capital costs and recent findings in the field of financial economics that are germane to the determination of the cost of capital. Those objective indicators and the recent research support cost of equity capital estimates below 10%. Second, I review the current economic environment in which my equity return estimate is made. Third, I review the capital structure requested by HECO for ratemaking purposes in comparison to capital structures employed by the Company and its parent historically, as well as capital structures prevalent in the electric utility industry. From that review, I develop a capital structure appropriate for ratemaking purposes.

Fourth, I evaluate the cost of equity capital for similar-risk utility operations using Discounted Cash Flow (DCF), Capital Asset Pricing Model (CAPM), Modified Earnings-Price Ratio (MEPR), and Market-to-Book Ratio (MTB) analyses. Fifth, I comment on the pre-filed cost of capital testimony submitted by Company witness, Dr. Roger Morin.

I have estimated the equity capital cost of similar-risk electric utility companies to fall in a range of 9.00% to 9.75%. Within that range, due to the Company's relatively low financial risk, I estimate the equity cost of the Company's utility operations to be below the mid-point of a reasonable range of equity costs for fully-integrated electric utilities —9.25%.

Applying that 9.25% equity capital cost to the Company's recent average capital structure, containing 52.01% common equity, 1.82% preferred stock, 2.58% hybrid securities, 37.87% long-term debt, and 5.72% short-term debt, produces an overall cost of capital of 7.70% (DOD 215, p. 1). That overall cost of capital affords the Company an opportunity to achieve a pre-tax interest coverage level of 4.23 times. That level of pre-tax coverage is well above the level of interest coverage actually achieved by HECO over the

past five years, which has averaged 3.41x.[1] Also, the overall return I recommend would afford the Company an opportunity to achieve cash flow metrics that would support the Company's current "BBB" rating (DOD 215, p. 2). Therefore, the capital structure and equity return I recommend is sufficient to support the Company's financial position and fulfills the requirement of providing the Company the opportunity to earn a return which is commensurate with the risk of the operation while maintaining the Company's ability to attract capital.

Q. WHY SHOULD THE COST OF CAPITAL SERVE AS A BASIS FOR THE PROPER ALLOWED RATE OF RETURN FOR A REGULATED FIRM?

A. The Supreme Court of the United States has established, as a guide to assessing an appropriate level of profitability for regulated operations, that investors in such firms are to be given an opportunity to earn returns that are sufficient to attract capital and are comparable to returns investors would expect in the unregulated sector for assuming the same degree of risk. The Bluefield and Hope cases provide the seminal decisions [Bluefield Water Works v. PSC, 262 US 679 (1923); FPC v. Hope Natural Gas Company, 320 US 591 (1944)]. These criteria were restated in the Permian Basin Area Rate Cases, 390 US 747 (1968). However, the Court also makes quite clear in Hope that regulation does not guarantee profitability and, in Permian Basin, that, while investor interests (profitability) are certainly pertinent to setting adequate rates, those interests do not exhaust the relevant considerations.

As a starting point in the rate-setting process, then, the cost of capital of a regulated firm represents the return investors could expect from other investments, while assuming no more and no less risk. Since financial theory holds that investors will not provide capital for a particular investment unless that investment is expected to yield the opportunity cost of capital, the correspondence of the cost of capital with the Court's guidelines for appropriate earnings is clear.

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[1] HECO 2006 S.E.C. Form 10-K, Exhibit 12 (Pre-tax interest coverages: 2006 (3.27x), 2005 (3.36x), 2004 (3.60x); average = 3.41).

I. INVESTOR RETURN EXPECTATIONS—OBJECTIVE EVIDENCE

Q. THE MEDIAN EQUITY RETURN AWARD FOR ELECTRIC UTILITIES IN THE U.S. OVER THE PAST YEAR WAS 10.25%.[2] YOUR EQUITY RETURN RECOMMENDATION FOR HECO IS BELOW THAT LEVEL. ARE THERE OBJECTIVE INDICATORS THAT SHOW YOUR ESTIMATE IS REASONABLE?

A. Yes, there is both practical and theoretical evidence, which shows that an equity return of 9.0% to 9.75% for an integrated electric utility operation is not only reasonable, but may, in fact, be generous.

Compelling evidence that investor equity return expectations are similar to my estimate of the current cost of equity in this proceeding and below average allowed returns for utilities is provided by the Company itself. In its 2006 S.E.C. Form 10-K, at page 135, Hawaiian Electric Industries published data regarding the Company's pension plan and the expected return on the invested assets in that portfolio. The Company's published data indicate that it expects to earn an 8.5% return on its pension fund portfolio. The portfolio's target asset composition is approximately 70% equity investments and 30% debt and other investments. In a confidential response to DOD-IR-19, the Company provided the long-term equity and debt return assumptions that produced the 8.5% overall return expectation for its investment portfolio. The Company expects to earn a return of less than 10% on its U. S. equity investments.

Other utilities do not consider that sort of data to be confidential and publish it in their S.E.C. filings. For example, Northeast Utilities (one company included in my HECO similar-risk sample group) indicates, at page 31 of its 2006 Annual Report, that its retirement portfolio is expected to earn a long-term return of 8.75%. Northeast Utilities also indicates that its long-term return expectation for the U.S. equity market is 9.25%.

Similarly, American Electric Power Company (AEP, another company included in the HECO similar-risk group) published data regarding its pension plan and the expected

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[2] Regulatory Research Associates, Regulatory Focus, January 30, 2007, p. 7.

return on the invested assets in that portfolio. AEP's expected return on its diversified portfolio of equity investments is 10%.[3] Importantly, all of the long-term equity return expectations are for the U.S. stock market, generally, not for lower-risk utility stocks, which would be expected to provide a lower return.

Q. IS THE EQUITY RETURN EXPECTATION EMBODIED IN UTILITIES' RETIREMENT PORTFOLIO RETURN PROJECTIONS RELEVANT TO THE DETERMINATION OF THE COST OF EQUITY IN A RATE CASE?

A. Yes. The definition of the cost of equity capital for a firm is the return investors expect to earn over the long-term. A firm must provide an investor the return he/she expects in order for the investor to have an incentive to purchase the securities of that firm. That investor-expected return is the parameter we seek to estimate in rate proceedings. In proceedings such as this we estimate investors' expected return for utility stock using econometric models like the DCF and CAPM.

However, utilities' published long-term expected return on the common stock portion of their investment portfolio provides direct, objective evidence regarding investors' expected return. Therefore, the return utilities expect to earn on their own equity investments is not only directly relevant to the cost of equity capital, it is the very definition of that parameter we seek to estimate in rate proceedings.

The long-term equity return expectation (provided in confidential response to DOD-IR-19) for the Company's own pension fund is below 10%. Therefore, the Company's own equity return expectations, as well as that of other utilities published in their Annual Reports to shareholders provide compelling evidence that: 1) my 9.0% to 9.75% equity cost estimate for electric utilities is reasonable (if not conservative), and 2) the Company witness' equity return recommendation, 11.25%, is substantially in excess of the return expected in U.S. equity markets and is, therefore, inflated.

[3] AEP 2006 Annual Report, p. A-25.

Q. ISN'T IT POSSIBLE THAT THE EQUITY RETURN PROJECTIONS FOR THE PENSION FUND ARE LOW IN ORDER NOT TO EXAGGERATE THE FUTURE VALUE OF THAT FUND?

A. It is reasonable to believe that the Company would not want to use return expectations that are too high for its pension fund assets because that would exaggerate the expected future value of that fund. Moreover, if the expected returns are continually over-estimated, the current funding requirement would be understated and the Company would be left with unfunded pension liabilities that could add unnecessarily to its financial risk profile.

However, it is also reasonable to believe that the Company would not want to under-estimate the pension fund return estimates, because that would call for an unnecessarily high annual contribution every year to reach the future targeted amount of pension funds. An unnecessarily large annual pension expense would reduce the Company's profitability. In addition, if ultimate returns turn out to be higher than predicted through under-estimating the portfolio return, the Company will, effectively, have funded its pension requirements with monies that could have been put to other uses such as production or distribution facilities.

Therefore, because there are negatives associated with either over- or under-stating expected pension portfolio returns, we must assume that Company management seeks to accurately estimate its expected investment returns and actually believes that, over the long-term, the common equity return expectations for its pension fund investments are in the single-digit range, cited above.

Q. IS IT TRUE THAT PROJECTED PENSION FUND RETURNS ARE PART OF AN ACTUARIAL PROCESS AND, THEREFORE, FUNDAMENTALLY DIFFERENT FROM A COST OF EQUTIY CAPITAL ANALYSIS?

A. No. It is not true that the expected return on equity investments embodied in utilities' pension fund returns is different from the cost of equity capital—it is an objective measure of investor return expectations, which is the definition of the cost of equity capital.

It is certainly true that pension fund expense is calculated by actuaries who adhere to

generally accepted professional procedures of actuarial science, which are based on fundamental principles of statistics, accounting and finance. It is also true that the expected return is only one part of the determination of the current annual pension fund expense. However, neither of those facts affect, in any way, the validity of comparing the Company's expected return on the equity investments in its retirement portfolio to the cost of equity estimate I recommend in this proceeding. They are both investor-expected long-term equity return expectations.

In order to calculate a current pension fund expense many factors must be considered: the actual portfolio return earned in the most recent year must be determined, the differences between last year's expected return and the actual return must be accounted for, and the projected changes in the workforce and mortality statistics must be estimated. Those are all accounting/actuarial issues. However, those who calculate pension fund expense must also make many economic assumptions regarding expected returns on stocks and bonds in the future. Those assumptions are based on current yields, expected inflation, projected returns in the various asset classes, historical returns and risk premiums—all parameters considered in estimating the cost of equity capital. Therefore, the notion that the determination of pension fund expense is solely an actuarial exercise, and is, therefore, an entirely separate concept from the cost of equity (investors' expected return), is incorrect.

A key economic assumption that must be made in the determination of current pension fund expense—and the one on which I focus as support for my equity cost estimate—is the long-term expected return on the equity assets in the Company's retirement portfolio. The Company has an obligation to its employees to provide a pension when they retire. Therefore, it has to have available a certain amount of money in the future to pay those retirees. In order to make sure they have that money available in the future, the Company currently has a large investment portfolio.[4] In order to know if the current investment portfolio will generate the monies necessary when their workers retire, the Company must estimate the annual rate of return it will earn on the equity and debt assets

[4] According to its 2006 S.E.C. Form 10-K, HEI's pension fund portfolio is approximately $875 Million.

that it currently has invested.

The annual return on the equity portion of the Company's portfolio is an objective measure of investors' long-term equity return expectations—it is what one large investor (HEI) believes it will earn on its equity investments over the long-term. That is precisely the parameter the cost of equity analyst seeks to estimate using the DCF and CAPM analyses. Therefore, even though the expected long-term return on equity used by HEI to project the future value of its pension fund portfolio is only one part of a complicated process of determining the current pension expense, it is a legitimate measure of investors' long-term equity return expectations, which is directly equivalent to the cost of equity capital.

Q. ARE THERE OTHER OBJECTIVE EXAMPLES OF CURRENT INVESTOR-EXPECTED EQUITY RETURNS?

A. Yes, there are examples in the capital marketplace and the financial media indicating that investor return requirements for utilities are quite modest. For example, a recent A.G. Edwards report on the gas utility industry shows that market return expectations for gas utility stocks are well below 10%.[5] The report states that, for a sample of 15 large and small gas distributors, the median total return expectation (dividend yield plus expected growth—a DCF-type calculation) is 7.8%.

Value Line publishes similar expected returns for the utilities used in my similar-risk sample group to estimate the cost of equity for HECO. As part of the data array published for each of the companies it follows, Value Line publishes its expectations for a three- to five-year total return (dividends plus stock price change). For the electric utilities that I use to estimate the cost of equity in this proceeding, Value Line currently projects an average three- to five-year total return expectation ranging from 0% to 8%. The return expectations for energy utilities published by AG Edwards and Value Line are representative of the equity return expectations presented to investors today and are generally below my recommended return on common equity in this proceeding.

[5] A.G. Edwards, "Gas Utilities Quarterly Review," April 5, 2007.

In addition, in a letter published in late 2004 by Public Utilities Fortnightly, a prominent electric industry analyst and author confirms that single-digit return expectations are reasonable for utility investments, and those expectations comport with recent economic research:

> Finally, let's get real about investor expectations, now that investors have begun to get real. Articles on the topic fill the financial journals. They feature variants on this theme: Over time the average equity investment produces an annual total return (dividends plus stock price appreciation) of 6.5 per cent per year in real terms, the bulk of which comes from the dividend component. Add inflation expectations to that number, and you get an 8.5 to 9.5 percent return in nominal terms. The average back-to-basics utility yields about 5 to 6 percent and might grow 3 to 4 percent per year, which adds up to produce a total return expectation of 8 to 10 percent per year, not far from the return the journals posit for the market. (Hyman, Leonard, Senior Consultant, R.J. Rudden Associates, Letters to the Editor, *Public Utilities Fortnightly*, August 2004, p. 10)[6]

The articles in the financial journals, to which the author of the preceding quote refers, relate to recent research involving the market risk premium. The market risk premium is the additional return above the risk-free rate of interest that investors expect to earn by investing in stocks rather than risk-free U.S. Treasury securities. This recent academic research indicates that the market risk premium based on the often-cited Ibbotson (now Morningstar) historical data substantially overstates investor expectations for returns in the future. Moreover, this relatively recent research supports the reasonableness of investor-expected returns below 10%.

Q. PLEASE EXPLAIN HOW CURRENT RESEARCH RELATED TO THE MARKET RISK PREMIUM SUPPORTS YOUR ESTIMATE OF THE COST OF EQUITY CAPITAL.

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[6] Mr. Hyman is the author of America's Electric Utilities, Past, Present and Future, 8th Ed., Public Utilities Reports, Inc., Vienna, VA, 2005.

A. As noted above, the market risk premium is the difference between the return investors expect on stocks and the return they expect on bonds (often a risk-free rate of return like a U.S. Treasury bond). The "traditional" view, supported primarily by the earned return data over the past 80 years published by Morningstar[7], is based on the historical difference between the returns on stocks and the returns on bonds. That view assumes that the returns actually earned by investors over a long period of time are representative of the returns they expect to earn in the future.

For example, the Morningstar data show that investors have earned a return of 12.3% on stocks and 5.8% on long-term Treasury bonds since 1926.[8] Therefore, based on those historical data, it is often assumed that investors will require a risk premium in the future of 6.5% above the long-term risk-free rate to invest in stocks [12.3% - 5.8% = 6.5%]. With a current long-term T-Bond yield of 4.9%, that assumption indicates an investor expectation of an 11.4% return for the stock market in general [4.9% + 6.5% = 11.4%].

However, current research indicates that there are aspects of the Morningstar historical data set that, when examined, point not only to lower historical risk premiums than those reported by Morningstar but also expected risk premiums that are much lower. Dimson, Marsh and Staunton author a recent article that evaluates returns over the past 100 years in the U.S., as well as other established stock markets, "Risk and Return in the 20th and 21st Centuries." Those researchers summarize their findings this way:

> The single most important contemporary issue in finance is the equity risk premium. This drives future equity returns, and is the key determinant of the cost of capital. The risk premium—the expected reward for bearing the risk of investing in equities, rather than in low-risk investments such as bills or bonds—is usually estimated from historical data....The authors show that the historical equity risk premium has been lower than previously believed, and argue that the future risk premium is likely to be lower still.

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[7] Morningstar is a investor service firm that publishes historical data related to the stock and bond markets from 1926 through the most recent year. The publications are updated each year. Morningstar recently purchased Ibbotson Associates business and now publishes the same material previously published by Ibbotson.

[8] Morningstar, SBBI Valuation Edition, 2007 Yearbook, p. 28.

(Dimson, Marsh, Staunton, "Risk and Return in the 20th and 21st Centuries," *Business Strategy Review*, 2000, Volume 11, Issue 2, pp. 1-18)[9]

Dimson, et al, show that the Morningstar historical data set, which measures bond and stock returns from 1926 forward, suffers from survivor bias. Simply put, Morningstar's data are based on the stock market results of only the successful stocks, i.e., those that were successful enough to be listed on a major U.S. exchange. The return data of the stocks that did not grow large enough to be listed on a stock exchange or data from markets or time periods that were difficult to measure are not included in the Morningstar data—and those results are overstated for that reason. Dimson, et al, measure historical returns over a longer period than Morningstar—100 years of data—and includes an analysis of the returns of stock markets in other countries, which gives a broader sample of investor opinion than the oft-cited Morningstar data.

Researching more data over a longer period of time, those authors come to the conclusion that over the past 100 years common stocks worldwide have earned an average arithmetic return that is 5.0% above Treasury bonds.[10] Morningstar's return difference between stock and long-term bonds is 6.5%—150 basis points higher.

However, Dimson and his co-authors show that historical results, alone, are not accurate measures of future returns expectations unless the abnormalities in the historical record that are unlikely to exist in the future are removed. Taking those facts into account, the authors conclude that, "the key qualitative point is that [the expected risk premium] is lower than the raw historical risk premium."

Dimson, et al, are not alone in recognizing lower market risk premiums. There is significant additional research on historical returns that supports the reasonableness of lower market risk premiums. For example, in Stocks for the Long Run, A Guide to Selecting Markets for Long-term Growth (Irwin Professional Publishing, Chicago, IL,

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[9] The Dimson, et al, article cited here was an advance summary of a subsequent textbook on the subject of the market risk premium: Triumph of the Optimists, Princeton University Press, Princeton NJ, 2002.

[10] A market risk premium of 5% added to a current T-Bond yield of 4.9% would indicate an equity return expectation for common stocks of 9.9% (expected utility stock returns would be lower).

1994, pp. 11-15), Professor Jeremy Siegel concludes that between 1802 and 1992, the return differential between stocks and long-term Treasuries ranged from 3.4% to 5.1%. Using the approximate mid-point, a 4% historical risk premium would indicate that investors could reasonably expect a stock market return of about 9% (5% long-term T-Bonds plus a 4% risk premium).

Therefore, recent research on the historical market risk premium, using a broader range of stock market data, shows that the Morningstar data overstate long-term historical market risk premiums. Moreover, that research indicates that the risk premium investors expect for the future—the prime determinant of today's equity return requirements—is lower than long-term historical experience would indicate.

Q. IS THERE OTHER RECENT RESEARCH ON THE MARKET RISK PREMIUM THAT IS NOT BASED PURELY ON HISTORICAL EARNED RETURNS, AND WHICH SHOWS THE MARKET RISK PREMIUM TO BE SUBSTANTIALLY LOWER THAN THAT PUBLISHED BY MORNINGSTAR?

A. Yes, there is other new research regarding the risk premium, which is not based on historical earned returns. That research indicates the Morningstar results are skewed upward and that the forward-looking market risk premium is much lower. In 2003, widely respected researchers Eugene Fama and Kenneth French published an article in *The Journal of Finance* focusing on the equity risk premium and measured (instead of the realized return) the expected return on the market less the expected return on bonds (the yield) over a long-term period as well as several sub-periods. Their research based on long-term historical expected returns indicates that the *expected* (i.e., forward-looking) risk premium is in the range of 2.6% to 4.3%.[11]

Also, two finance professors cited by Company witness Morin for authority, Graham and Harvey of Duke University, in conjunction with *CFO Magazine*, regularly poll corporate financial officers regarding their expectations regarding the expected market risk

[11] Fama, E., French, K., "The Equity Premium," *The Journal of Finance*, Vol. LVII, No. 2, April 2003, pp. 637-659.

premium. The most recent result of the quarterly poll (January 2007) indicates that the financial executives polled expect stock returns over the next ten years to be only 3.2% higher than bond returns.[12] Since the survey was initiated (2000), the forward-looking market risk premium has ranged from about 2.5% to 4.5%. That means that corporate financial officers—individuals that are arguably well versed in capital markets—expect equity returns to range from 2.5% to 4.5% above ten-year US Treasury bonds. With current 19-year Treasury bond yields of approximately 4.5%, the Duke survey pegs investor equity return expectations ranging from about 7.0% to 9.0%. In comparison to that expected range of returns for the stock market in general, my equity return recommendation for HECO's electric utility operations is certainly reasonable.

Also, in three independent papers presented to the Social Security Advisory Board, in 2001, John Y. Campbell (Harvard), Peter A. Diamond (M.I.T.), and John B. Shoven (Stanford), conclude that the long-term expected market risk premium is lower than exemplified by historical experience and will range from 3% to 4% above US Treasury securities in the future. With current T-Bond levels, that risk premium indicates an expected return on the stock market, generally, of about 8% to 9%. Again, my 9.25% recommendation for HECO's electric utility operations is quite reasonable by that measure.

I have mentioned a few of the research articles regarding the market risk premium that have been published over the last few years. There have been many, and the vast majority of them indicate that the expected market risk premium is below that exhibited in the Morningstar historical data.[13] That information, as well as the research cited above, indicates that my 9.25% equity return recommendation for the electric utility operations of

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[12] Graham, J., Harvey, C., "The Equity Risk Premium in January 2007: Evidence from the Global CFO Outlook Survey," Duke University/CFO Magazine, http://www.cfosurvey.org.

[13] There is only one academic study that, to my knowledge, supports the Ibbotson (Morningstar) historical risk premium data: Harris, Marston, Mishra and Obrien, "Ex Ante cost of Equity Estimates of the S&P 500 Firms: The Choice between Global and Domestic CAPM," *Financial Management*, Autumn 2003, pp. 51-66. Dr. Morin cites this study in his CAPM analysis. However, that study reviewed a relatively short period of data (mid-80s to late 90s), which included the longest bull market in U.S. history—unlikely to be representative of long-term expectations for the future. I will discuss this paper in the final section of my testimony.

HECO in this proceeding is certainly reasonable and, if the new research regarding risk premiums is correct, may actually be too high.

Q. HAS THE RESEARCH YOU CITE FOUND ITS WAY INTO CONTEMPORARY FINANCE TEXTBOOKS?

A. Yes. In the 2006 edition of a "best-selling" textbook cited by Dr. Morin for authority, Brealey, Meyers and Allen[14] discuss the findings of Dimson, Staunton and Marsh, who conclude 1) that the historical market risk premium is lower than that reported by Morningstar, and 2) the expected risk premium is lower still. Importantly, in prior editions of their textbooks Brealey, et al, cited the Morningstar historical data; now they do not. They also discuss other recent findings cited previously in my testimony (e.g., Fama/French, Graham/Harvey). The textbook authors conclude, based on a review of the recent evidence regarding the market risk premium, that a reasonable range of equity premiums above short-term Treasury Bills is 5% to 8%.[15] Because, the long-term historical difference in the return between T-Bonds and T-Bills has been 1.2%, Brealey and Meyers' textbook indicates a long-term market risk premium ranging from 3.8% to 6.8% [5% - 1.2% = 3.8%; 8% - 1.2% = 6.8%].[16] The mid-point of that 3.8% to 6.8% reasonable risk premium range is 5.3%. That average market risk premium added to a current T-Bond yield of 4.9%, would produce a current equity return expectation for the stock market of 10.2%. Because utility stocks are less risky than the market as a whole, an appropriate return on equity for HECO would be lower.

Q. DO THE OBJECTIVE COST OF EQUITY INDICATORS YOU CITE COMPORT WITH RECENT THEORETICAL RESEARCH IN THE FIELD OF FINANCIAL ECONOMICS?

A. Yes. The objective indicators of investors' expected returns—utilities' pension fund equity

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[14] Brealey, R., Meyers, S., Allen, F., Principles of Corporate Finance, 8th Edition, McGraw-Hill, Irwin, Boston MA, 2006.
[15] Op cit, p. 154.
[16] OP cit, pp. 149, 222.

return expectations and investors service total return projections—indicate that equity costs are below 10%. Recent academic research regarding forward-looking market risk premiums also indicates that investors' required returns are at or below 10%.

The application of econometric models like the DCF and CAPM necessarily include the subjective judgment of the analyst.[17] Therefore, it is useful, in my view, to present examples of equity return expectations that are published by independent sources, published in academic journals and textbooks, are available to the public and are representative of the level of returns actually expected by investors. If the expected equity returns available in independent published sources are similar to the returns provided by econometric analysis, then the equity cost estimate is more robust. In the instant proceeding, my 9.25% equity cost estimate is supported by several other independent indicators and the equity cost estimate proffered by the Company's witness (11.25%) is not.

II. ECONOMIC ENVIRONMENT

Q. WHY IS IT IMPORTANT TO REVIEW THE ECONOMIC ENVIRONMENT IN WHICH AN EQUITY COST ESTIMATE IS MADE?

A. The cost of equity capital is an expectational, or *ex ante*, concept. In seeking to estimate the cost of equity capital of a firm, it is necessary to gauge investor expectations with regard to the relative risk and return of that firm, as well as that for the particular risk-class of investments in which that firm resides. Because this exercise is, necessarily, based on understanding and accurately assessing investor expectations, a review of the larger economic environment within which the investor makes his or her decision is most important. Investor expectations regarding the strength of the U.S. economy, the direction of interest rates and the level of inflation (factors that are determinative of capital costs) are key building blocks in the investment decision. The analyst and the regulatory body should

[17] While the Company witness would argue that the use of analysts' earnings growth rates, for example, eliminates subjectivity from the DCF, that is untrue. The decision to use only one measure of future growth when many others are available is a subjective choice that can have a dramatic affect on the outcome of the model, as I will demonstrate in the final Section of my testimony.

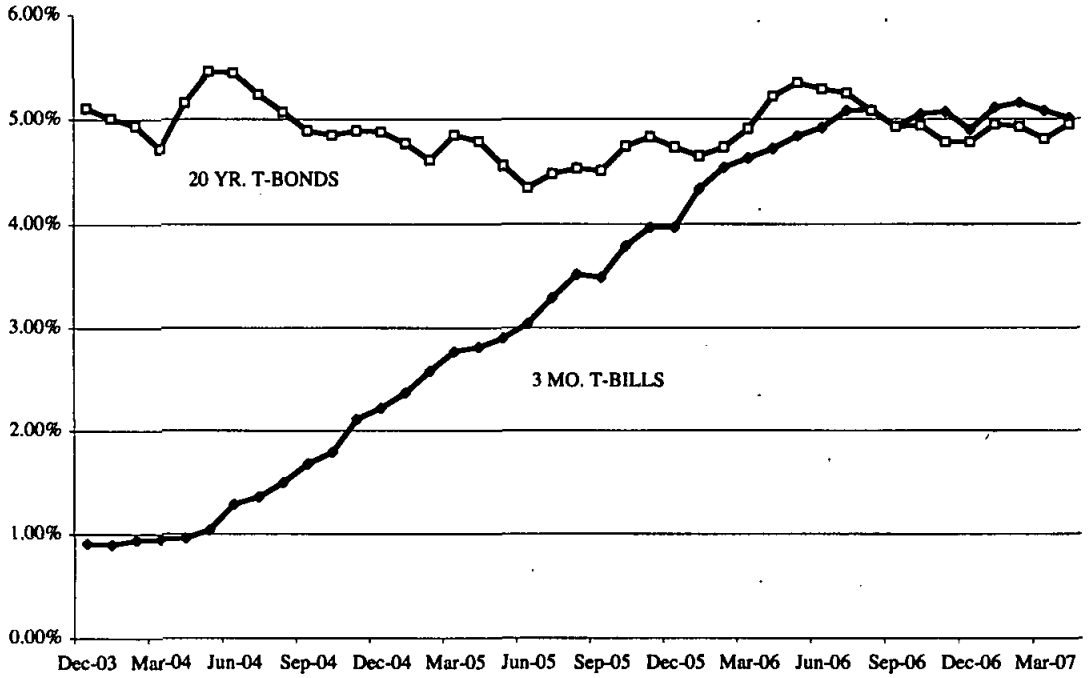
review those factors in order to assess accurately investors' required return—the cost of equity capital to the regulated firm.

Q. DOES THE EVIDENCE AVAILABLE IN THE CURRENT ECONOMIC ENVIRONMENT INDICATE THAT CAPITAL COSTS CONTINUE TO BE LOW?

A. Yes. First, the overall level of fixed-income capital costs has been relatively low for several years, and continues to be relatively low at the current time. Although, as shown in the chart below, there has been steady upward movement in *short-term* interest rate levels over the past three years as the Federal Reserve (Fed) has raised the Federal Funds rate, long-term interest rates have fluctuated in a range of 4.5% to 5.5% over that same time period. This indicates that even though the Fed has raised short-term interest rates and the spread between long-term and short-term treasuries is well below the historical average, investors are not convinced that the overall level of economic growth will be sufficient to warrant an increase in long-term interest rates and long-term capital cost rates. As a result long-term capital costs have not increased to a substantial extent, even though the Fed has substantially increased short-term rates.

Chart I.

RECENT INTEREST RATE CHANGES



Data from Federal Reserve Statistical Release H.15

Another indication of the reason investors are willing to buy and hold stocks that offer what seem to be relatively low returns is shown in DOD 204, page 1, which depicts Moody's Baa-rated bond yields from 1984 through April 2007. Page 1 of Schedule 1 shows that interest rates over the past couple of years are very low relative to the interest rate levels that existed in the mid-1980s, and are part of a general downward trend in capital costs begun in 2000.

Also, page 2 of DOD 204 which presents the year-average Moody's Baa-rated bond yields for each year over the past 37 years (1968-2006), shows that Baa-rated bond yields in 2006, even with an increase from 2005 levels, are still below the bond yield levels seen in the U.S. in the late 1960s. Also, the most recent average Baa-rated utility bond yield, 6.20%,[18] falls at the lower end of the range of interest rates that have existed over the past

[18] Value Line *Selection & Opinion*, most recent six weekly editions (4/20/07-5/25/07, inclusive), 20/30-year Baa-rated utility bond yield averages.

30 years. Simply put, a fundamental reason that the current cost of common equity capital for electric utility operations of 9.00% to 9.75% is reasonable is that long-term capital cost rates are as low as they have been in more than thirty years. The above data indicate that capital costs, even with the recent credit tightening by the Federal Reserve Bank, remain at low levels and generally support the reasonableness of relatively low equity capital costs.

Q. WHAT IS THE CURRENT EXPECTATION WITH REGARD TO THE ECONOMY AND INTEREST RATES?

A. As Value Line notes in its most recent Quarterly Review, the current expectation is that the economy will expand at a moderate pace during 2008, and inflation and interest rates will also continue to be relatively moderate. The following excerpts from Value Line explain how a relatively low interest rate environment will be preserved:

> **Economic Growth:** As noted, the slowed abruptly last year, with a clearly unsustainable 5.6% rate of first-quarter growth easing to 2.6^ in the second three months. The rate of GDP growth then slowed further in the third and fourth quarters and, as indicated, moderated to just 1.3% in this year's initial period. Now, buoyed by a welcome pickup in the rates of manufacturing activity and industrial production and a likely increase in nonresidential construction spending, we should see growth move back into the 2%—or a bit higher—range in the current quarter and during the second half of 2007 [Chart omitted]. How far above 2% we get in the months to come will depend, to no small degree, on the upcoming level of retail spending, the pace of employment growth, the trend in exports, and the magnitude and duration of the slump in housing demand [Charts omitted]....
>
> Our economic forecast also assumes the Fed will support this likely acceleration in growth by voting one to three interest rate cuts, that the auto market will enjoy somewhat stronger demand, and that both the consumer and capital goods sectors will stabilize at comfortable levels. Finally we expect oil prices to hold near current levels, after gyrating wildly in 2006 and for global events to be neither supportive nor disruptive, on balance. This last item, is, of course, a most risky assumption.
>
> **Inflation**: Here, the picture is mixed as well. For example, month-to-month changes in producer (wholesale) and consumer prices have been sizable at times, with the volatility typically the result of wild swings in oil prices and, to a somewhat lesser degree, in food costs. If we back out these

> components, to get to so-called core rate of inflation, we find a more stable trend....
>
> Our feeling is that we are not in a period of worrisome inflation and, in fact, as the pace of economic growth is likely to remain below the long-term trend of 3.0%-3.5% over the next two years, the currently elevated rate of resource utilization (i.e., factory use levels) should gradually come down, pushing "core" inflation down to 2%, or so, where the Fed would be more comfortable, in our opinion [Chart omitted]].
>
> **Interest Rates**: The Fed's early May meeting, and its indicated intent to leave interest rates at current level s for the time being, suggests that we may not see a reduction in short-term borrowing costs until late this year. Our feeling also is that the Fed will vote on one to three interest-rate cuts over the next year, or so. Thereafter, it will probably survey the economic landscape, in particular the housing and inflation pictures, to see where it will go next. Oil prices and the global situation also will affect the Fed's rate decisions. We thing borrowing-cost adjustments will be modest over the next one to two years, assuming that our benign business assumptions are near the mark [Chart omitted]. (The Value Line Investment Survey, *Selection & Opinion*, May 25, 2007, pp. 4709-4710)

In that most recent Quarterly Economic Review, cited above, Value Line projects long-term Treasury bond rates will average 4.8% through 2007 and 5.0% through 2008. The recent six-week average 30-year T-bond yield is 4.90% (data from Value Line, *Selection & Opinion*, six weekly editions, April 20, through May 25, 2007). Therefore, the indicated expectation with regard to interest rates is that they are likely to remain within a range near current levels.

III. CAPITAL STRUCTURE

Q. WHAT IS THE CAPITAL STRUCTURE REQUESTED BY THE COMPANY IN THIS PROCEEDING?

A. The Company's requested capital structure is shown on HECO-1901. That capital structure consists of 55.30% common equity, 1.76% preferred stock, 2.35% hybrid preferred securities, 36.49% long-term debt, 0.87% Lease Obligations, and 3.22% short-term debt.

Q. IS THAT CAPITAL STRUCTURE SIMILAR TO THE MANNER IN WHICH HECO HAS BEEN CAPITALIZED RECENTLY?

A. No. The Company's requested capital structure contains a higher percentage of common equity and a lower percentage of debt capital than the Company has actually utilized over the most recent five quarters. As shown on page 1 of DOD 205, the equity capital portion of HECO's capital structure has fluctuated between 51% and 53% of total capital, averaging 52% common equity over that recent period. However, at no time was the Company's common equity ratio as high as that which it requests in this proceeding.

Because common equity, on a pre-tax ratemaking basis is about twice as costly as debt capital, the Company's requested capital structure will be substantially more costly than the capital structure with which it has recently been capitalized. For example, HECO-1701 indicates that HECO's jurisdictional rate base is approximately $1.2 Billion. Assuming the Company were awarded its requested 11.25% ROE, the additional 3.3% common equity HECO is requesting in this proceeding over the amount in use over the past year [55.30% (requested) less 52.0% (five quarter average)] would cost Oahu ratepayers and additional $7 Million every year. [$1.2 Billion Rate Base x 3.3% x 11.25% ÷ (1-40% tax rate) = $7.425 Million]

It is also worth noting that in the Company's last rate case (Docket No. 04-0113), HECO requested rates be set on the following capital structure: 55.30% common equity, 1.76% preferred stock, 2.35% hybrid preferred securities, 36.49% long-term debt, 0.87% Lease Obligations, and 3.22% short-term debt (see HECO 2101, updated 5/5/05, Docket No. 04-0113). The capital structure requested in the last case is very similar to that requested in this proceeding—the equity ratios are identical. However, the capital structure actually used by the Company over the most recent five quarters contained substantially less common equity (about 52%), and was, therefore, substantially less expensive than the capital structure requested in HECO's most recent rate proceeding (55.3% common equity).

Q. HOW IS HECO's PARENT COMPANY, HEI, CAPITALIZED?

A. Page 2 of DOD-205 shows the capital structure of HECO's parent company, Hawaiian Electric Industries, over the past five quarters, as provided by the Company in response to DOD-IR-05. All debt attributable to the banking operations has been excluded and 100% of the equity appearing on HEI's books has been attributed to HECO and HEI's non-bank corporate operations. Such treatment overstates the actual common equity ratio of HEI as reported to the financial community.

Nevertheless, even with that overstatement, the parent company's common equity ratio, over the most recent five-quarter time period, averaged 46.22% common equity, 1.36%, preferred stock, 44.73% long-term debt and 7.69% short-term debt. Again, those figures are absent any consideration of bank debt.

Q. THE PARENT COMPANY HAS MORE DEBT AND LESS EQUITY THAN THE RATEMAKING CAPITAL STRUCTURE REQUESTED BY HECO. DOES THE PARENT COMPANY ALSO HAVE LOWER OPERATIONAL RISK THAN UTILITY OPERATIONS?

A. No. HEI is a holding company that contains several business platforms. The majority of those operations are the regulated electric utility operations of HECO and its subsidiaries, which have relatively low operational risk and are the primary influence on HEI's business risk. However, HEI also owns two other operating segments: a banking segment and a diversified business segment. It is reasonable to believe that the competitive (i.e., non-utility) nature of HEI's banking and other business add to the overall risk profile of HEI as compared to HECO. However, due to the fact that HECO comprises more than 80% of the revenues of HEI, Standard & Poor's currently awards both entities a business risk ranking of 5 and a bond rating of "BBB." Therefore, it is reasonable to assume that the investment risk of HEI is reasonably similar to that of HECO.

Q. WHAT DOES THE RELATIVE BUSINESS RISK OF A FIRM HAVE TO DO WITH ITS CAPITAL STRUCTURE?

A. The manner in which a firm is most economically capitalized is a function of the volatility of the income stream generated by the assets of the firm or, in other words, the firm's operating (business) risk. For example, if a firm has an income stream that is not volatile and which can be predicted with near certainty, then a capital structure consisting of even 100% debt would not be problematic or risky. In fact, it would be the most cost-effective capital structure in that instance because debt is the least expensive form of investor-supplied capital for a firm and, without the possibility of operating income being insufficient to meet the debt service requirements, a 100% debt capital structure would be the prudent choice.

As the income stream of a firm becomes more volatile (more risky), financial theory holds that the amount of debt used should decline in order to avoid a default event (the failure to meet the required debt service costs). Although the reduction of lower-cost debt and the addition of higher-cost common equity will raise the firm's overall cost of capital, that increase is appropriate and economically efficient because it more appropriately matches the firm's financial risk with the increase in business risk. In that way, given an increased level of business risk, the cost of capital is minimized and the financial health of the firm is better assured.

An example of how the amount of debt in the capital structure varies with the operational or business risk of a firm is found in a recent publication by Standard & Poor's regarding utility business risk. A June 2004 publication by Standard & Poor's, in which that bond rating agency re-aligned its business risk profile scores for utility companies, indicates that the companies with higher business risk are required to have a lower debt ratio (less debt, more equity) in order to earn the same bond rating as a firm with lower business risk.[19]

For example, Standard & Poor's indicates that energy merchant/marketing

companies have high business risk. On a scale of 1 to 10 with, 10 representing the highest risk, energy trading companies have an average business risk profile score of 9. In order to achieve a bond rating of "BBB", companies with a business risk profile of 9, according to Standard & Poor's, should have a total debt ratio ranging between 40% and 50% of total capital. (A debt ratio between 40% and 50% corresponds to an equity ratio between 60% and 50%.)

In contrast, integrated utilities, like HECO, have lower business risk than energy trading companies. S&P currently assigns HECO a business risk profile score of 5. According to Standard & Poor's, in order to achieve a "BBB" bond rating, companies with a business profile score of "5"should be capitalized with a total debt ratio between 50% and 60% of total capital (or an equity ratio between 50% and 40% of total capital). Therefore, companies with lower business risk (like fully-integrated electric utility operations) are effectively capitalized with more debt and less equity than companies with higher business risk (like energy marketing companies).

Q. WHY SHOULD IT BE OF CONCERN TO THIS COMMISISON THAT HEI HAS SIMILAR BUSINESS RISK TO HECO, BUT A MORE HIGHLY LEVERAGED CAPITAL STRUCTURE THAN THE ONE REQUESTED BY THE COMPANY FOR RATESETTING PURPOSES?

A. There are two reasons. First, firms that have similar business risk should be capitalized similarly. However, in this instance HEI is capitalizing its consolidated operations with a common equity ratio substantially lower than that requested for ratemaking purposes by its utility subsidiary, HECO. Second, a more highly leveraged capital structure at the parent company level, when the regulated subsidiary faces similar or lower business risk, constitutes financial cross-subsidization of the unregulated parent (HEI) by the ratepayers

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[19] See Company Filing, Attachment III-F-4-C, Standard & Poor's Ratings Direct, New Business Profile

of the regulated entity (HECO).

Q. PLEASE EXPLAIN WHAT YOU MEAN BY FINANCIAL CROSS-SUBSIDIZATION AND WHY THIS COMMISSION SHOULD BE AWARE OF THAT ISSUE.

A. Cross-subsidization of a parent company's unregulated operations by its regulated subsidiary operations can occur in many forms. For example, the unregulated firm could provide services to the utility at above-market rates or, conversely, the utility could provide services to its unregulated affiliates at rates below that which would prevail in an arms-length transaction.

Financial cross-subsidization occurs when the capital structure of the utility operation provides financial strength to the holding company, which, in turn, allows the parent to capitalize its consolidated operations with more debt and less equity (i.e., more cheaply) than they would otherwise be able to do. In other words, the utility (and, thereby, utility ratepayers) shoulders some of the financial risk of the unregulated affiliates by allowing the holding company to be capitalized in a manner that would not prevail in a stand-alone situation.

One way that HEI can maintain a stronger financial profile and offset the risks of its unregulated operations and lower equity ratios, is to set rates with a high common equity ratio for its regulated utility operations while simultaneously financing its unregulated operations with a lower equity ratio and a higher percentage of debt capital than would otherwise be possible. That is the essence of financial cross-subsidization. The tangible result of that action is a common equity ratio for HEI that is substantially below that requested by the regulated subsidiary.

Scores Assigned for U.S. Utility and Power Companies: Financial Guidelines Revised, June 2, 2004.

Q. IS THE CAPITAL STRUCTURE REQUESTED BY THE COMPANY IN THIS PROCEEDING SIMILAR TO THE AVERAGE CAPTIAL STRUCTURE IN THE ELECTRIC INDUSTRY TODAY?

A. No. The capital structure requested by HECO in this proceeding contains considerably more common equity and less total debt (long- and short-term debt) than is used on average in the electric industry today. DOD 205, page 3 shows common equity ratio as a percent of total capital (i.e., including short-term debt) for the electric industry as published in the June 2007 edition of AUS Utility Reports.

The average common equity ratio in the electric utility industry is 44%. Also shown on page 3 of DOD-205 are the average common equity ratios of my similar-risk sample group, as well as that of Dr. Morin's two sample groups (his integrated electric group and his Moody's electric group). The average common equity ratio of all those similar-risk sample group companies ranges from 43% to 44% of total capital. Those common equity ratios, for companies with similar bond ratings to HECO, are substantially below the level of common equity requested by HECO in this proceeding. By this objective measure, the capital structure requested by HECO in this proceeding implies substantially lower financial risk than the electric industry, generally, and the sample groups used in this proceeding.

Q. DOESN'T THE COMPANY TESTIFY THAT IT NEEDS A HIGHER COMMON EQUITY RATIO BECAUSE ITS PURCHASED POWER CONTRACTS ARE TREATED AS ADDITIONAL DEBT BY THE BOND RATING AGENCIES?

A. Yes, that is the Company's position; and it is true that purchased power expenses are considered by rating agencies as debt-like obligations. However, the companies in my sample group have purchased power expenses similar to HECO, and those companies maintain an average bond rating equal to HECO's with an average common equity ratio of only 44%.

HECO reports in its 2006 S.E.C. Form 10-K (p. 145), that purchased power expenses were at a level that equaled 26% of revenues. Nine other companies in my sample group provide enough detail regarding purchased power expenses to calculate that their

average purchased power expense is approximately 19% of their 2006 electric revenues. Also Value Line reports that 38% of HECO's generation is from purchased power, and, for nine of the other companies in my sample group for which Value Line reports purchased power percentages, the average is 28%. Therefore, those companies have, by that measure, somewhat lower, but generally similar purchased power risk to HECO. Those companies are capitalized more economically (less expensively), i.e., with considerably less common equity and more debt than HECO. Also, their average bond rating is "BBB", the same as HECO's bond rating.

Q. WHAT CAPITAL STRUCTURE DO YOU RECOMMEND FOR RATESETTING PURPOSES IN THIS PROCEEDING?

A. I believe a ratemaking capital structure based on the Company's actual recent-average capital structure would be reasonable. It would be more cost-effective than the capital structure requested by the Company and moderate the difference between the common equity ratio used to set rates and that used by HEI. However, it is important to remember that HECO's recent average capital structure, which contains approximately 52% common equity, is significantly less leveraged (less financially risky) than that of either the industry as a whole or the sample group of electric companies I use to estimate the cost of equity capital. Therefore, the allowed return on equity for HECO should be below the mid-point for the sample group due to the Company's lower financial risk.

Page 4 of DOD-205 shows the recommended ratemaking capital structure and associated cost rates. The capital structure consists of 52.01% common equity, 1.82% preferred stock, 2.58% hybrid securities, 37.87% long-term debt and 5.72% short-term debt. The cost rates of preferred stock, hybrid securities, long-term debt and short-term debt are those requested by the Company.

IV. METHODS OF EQUITY COST EVALUATION

A. DISCOUNTED CASH FLOW MODEL

Q. PLEASE DESCRIBE THE DISCOUNTED CASH FLOW (DCF) MODEL YOU USED TO ARRIVE AT AN ESTIMATE OF THE COST RATE OF COMMON EQUITY CAPITAL FOR THE COMPANY IN THIS PROCEEDING.

A. The DCF model relies on the equivalence of the market price of the stock (P) with the present value of the cash flows investors expect from the stock, and assumes that the discount rate equals the cost of capital. The total return to the investor, which equals the required return and the cost of equity capital according to this theory, is the sum of the dividend yield and the expected growth rate in the dividend.

The theory is represented by the equation,

$$k = D/P + g, \qquad (1)$$

where "k" is the equity capitalization rate (cost of equity, required return), "D/P" is the dividend yield (dividend divided by the stock price) and "g" is the expected sustainable growth rate.

Q. WHAT GROWTH RATE (G) DID YOU ADOPT IN DEVELOPING YOUR DCF COST OF COMMON EQUITY FOR THE COMPANY IN THIS PROCEEDING?

A. The growth rate variable in the traditional DCF model is quantified theoretically as the dividend growth rate investors expect to continue into the indefinite future. The DCF model is actually derived by 1) considering the dividend a growing perpetuity, that is, a payment to the stockholder which grows at a constant rate indefinitely, and 2) calculating the present value (the current stock price) of that perpetuity. The model also assumes that the company whose equity cost is to be measured exists in a steady state environment, i.e., the payout ratio and the expected return are constant and the earnings, dividends, book value and stock

price all grow at the same rate, forever. As with all mathematical models of real-world phenomena, the DCF theory does not exactly "track" reality. Payout ratios and expected equity returns do change over time. Therefore, in order to properly apply the DCF model to any real-world situation and, in this case, to find the long-term sustainable growth rate called for in the DCF theory, it is essential to understand the determinants of long-run expected dividend growth.

Q. CAN YOU PROVIDE AN EXAMPLE TO ILLUSTRATE THE DETERMINANTS OF LONG-RUN EXPECTED DIVIDEND GROWTH?

A. Yes, in DOD 201, I provide an example of the determinants of a sustainable growth rate on which to base a reliable DCF estimate. In addition, in DOD 201, I show how reliance on earnings or dividend growth rates alone, absent an examination of the underlying determinants of long-run dividend growth, can produce inaccurate DCF results.

Q. DID YOU USE A SUSTAINABLE GROWTH RATE APPROACH TO DEVELOP AN ESTIMATE OF THE EXPECTED GROWTH RATE FOR THE DCF MODEL?

A. While I have calculated both the historical and projected sustainable growth rate for a sample of utility firms with similar-risk operations, I have not relied solely on that type of growth rate analysis. In addition to a sustainable growth rate analysis, I have also utilized published data regarding both historical and projected growth rates in earnings, dividends, and book value for the sample group of utility companies. Through an examination of all of those data, which are available to and used by investors, I estimate investors' long-term internal growth rate expectations. To that long-term growth rate estimate, I add any additional growth that is attributable to investors' expectations regarding the on-going sale of stock for each of the companies under review.

Q. WHY HAVE YOU USED THE TECHNIQUE OF ANALYZING THE MARKET DATA OF SEVERAL COMPANIES?

A. I have used the "similar sample group" approach to cost of capital analysis because it

yields a more accurate determination of the cost of equity capital than does the analysis of the data of one individual company. Any form of analysis in which the result is an estimate, such as growth in the DCF model, is subject to measurement error, i.e., error induced by the measurement of a particular parameter or by variations in the estimate of the technique chosen. When the technique is applied to only one observation (e.g., estimating the DCF growth rate for a single company) the estimate is referred to, statistically, as having "zero degrees of freedom." This means, simply, that there is no way of knowing if any observed change in the growth rate estimate is due to measurement error or to an actual change in the cost of capital. The degrees of freedom can be increased and exposure to measurement error reduced by applying any given estimation technique to a sample of companies rather than one single company. Therefore, by analyzing a group of firms with similar characteristics, the estimated value (the growth rate and the resultant cost of capital) is more likely to equal the "true" value for that type of operation.

Q. HOW WERE THE FIRMS SELECTED FOR YOUR ANALYSIS?

A. In selecting a sample of electric utility firms to analyze, I screened all the electric utilities followed by Value Line, because that investor service, in addition to providing a wealth of historical data, provides projected information, which is important in gauging investor expectations. I selected electric companies that had at least 70% of revenues from electric operations, did not have a pending merger, did not have a recent dividend cut, had stable book values and a senior bond rating between "A" and "BBB-." The screening process for electric utilities is summarized in DOD 206, attached to my testimony. The Companies selected for analysis are: FirstEnergy Corp. (FE), Northeast Utilities (NU), Progress Energy (PGN), Southern Company (SO), Alliant Energy (LNT), Ameren Corp. (AEE), American Electric Power (AEP), Cleco Corp. (CNL), DPL, Inc. (DPL), Empire District Electric (EDE), Entergy Corp. (ETR), Hawaiian Electric (HE), PNM Resources (PNM),

Pinnacle West Capital Corp. (PNW), and Unisource Energy (UNS).[20] For those companies, on average, 86% of the revenue is generated by electric utility operations.

Q. WHY HAVE YOU ELECTED TO INCLUDE HECO's PARENT COMPANY, HAWAIIAN ELECTRIC INDUSTRIES IN YOUR SAMPLE GROUP?

A. First of all, the parent company passed my screen, with revenues from electric operations greater than 70% of total revenues. While it is my understanding that this Commission has, in the past, elected not to rely on the market data of the parent company to determine the cost of equity of its regulated electric operations, I believe such action was taken to prevent the higher risk of unregulated operations from affecting the return allowed the regulated utility operations. To the extent that the parent company consolidated operations carry greater investment risk than HECO alone, my equity cost estimate should be viewed as conservative. However, I do not believe that HEI should be excluded from a similar-risk sample group.

Q. HAS YOUR SELECTION PROCESS PRODUCED A SAMPLE GROUP THAT IS SIMILAR IN RISK TO HECO?

A. Yes, according to objective measures of investment risk, the risk of the sample group is similar to that of HECO and, thus, will provide conservative estimate of the Company's cost of common equity capital. According to Standard & Poor's, HECO's business position is 5 on a scale of 1 through 10 (1 being lowest risk and 10 being the highest). The average business position of my sample group of electric utilities is 5.8. According to S&P's business position ranking, then, the sample group has higher business risk than HECO.

HECO's bond rating is "BBB" by Standard & Poor's, which is the same as the average S&P bond rating of the sample group. In sum, bond rating agency indicators imply that the investment risk of the sample group is similar to that of HECO.

[20] In the Schedules accompanying this testimony, the sample group companies are referred to by their stock ticker symbols, shown in parentheses here.

In addition, the companies included in my sample group have relatively similar purchased power risk to HECO. Value Line reports that 38% of the Company's generation is derived from purchased power. For the other companies in my sample group for which Value Line reports purchased power percentages, the average is 28%, with First Energy, Alliant, Cleco, Empire District, Entergy and Pinnacle West having purchased power generation ranging from 30% to 49% of total.

The Company witnesses imply that HECO's purchased power usage is "substantial." However, the average for the 38 companies for which Value Line reports an explicit purchased power percentage is 33.3%. Importantly, that average does not include companies that have no generation and purchase 100% of their power because, for those companies, Value Line does not list "generation sources." Therefore, while HECO's 38% is somewhat higher than average, it is well within one standard deviation from the mean (σ = 23.3%) and, therefore, not substantially different in terms of risk perception from the average utility. In sum, it is reasonable to believe that HECO does not have substantially greater purchased power risk than either my sample group or the electric industry in general.

Finally, most of the companies in my sample group have nuclear generation assets in rate base. Due to the nature of that generation technology, it carries a higher risk factor for investors. While HECO certainly has unique aspects to its generation mix (e.g., primarily oil-fired, no inter-island transmission interconnections), it does not face the risk of nuclear generation, and could be considered less risky in that regard.

Q. HOW HAVE YOU CALCULATED THE DCF GROWTH RATES FOR THE SAMPLE OF COMPARABLE COMPANIES?

A. DOD 207, pages 1 through 5, shows the retention ratios, equity returns, sustainable growth rates, book values per share and number of shares outstanding for the comparable electric companies for the past five years. Also included in the information presented in DOD 207 are Value Line's projected 2007, 2008 and 2010-2012 values for equity return, retention ratio, book value growth rates and number of shares outstanding.

In evaluating these data, I first calculate the five-year average sustainable growth rate, which is the product of the earned return on equity (r) and the ratio of earnings retained within the firm (b). For example, DOD 206, page 2, shows that the five-year average sustainable growth rate for Southern Company (SO) is 4.24%. The simple five-year average sustainable growth value is used as a benchmark for measuring the company's most recent growth rate trends. Recent growth rate trends are more investor-influencing than simple historical averages. Continuing to focus on SO, we see that sustainable growth in 2006 was about 3.68%—below the average growth for the five-year period, indicating a decreasing growth rate trend. By the 2010-2012 period, Value Line projects SO's sustainable growth will decline to a level that is below the recent five-year average—3.38%. These forward-looking data indicate that investors expect SO to grow at a rate in the future below to the growth rate that has existed, on average, over the past five years.

At this point I should note that, while the five-year projections are given consideration in estimating a proper growth rate because they are available to and are used by investors, they are not given sole consideration. Without reviewing all the data available to investors, both projected and historic, sole reliance on projected information may be misleading. Value Line readily acknowledges to its subscribers the subjectivity necessarily present in estimates of the future:

> We have greater confidence in our year-ahead ranking system, which is based on proven price and earnings momentum, than in 3- to 5-year projections. (Value Line Investment Survey, Selection and Opinion, June 7, 1991, p.854).

Another factor to consider is that SO's book value growth is expected to increase at a 5.0% level over the next five years, after increasing at a much slower 1.0% rate historically. This information would tend to increase growth rate expectations. However, this company has shed its unregulated generation operation in recent years and the comparative increase in book value also indicates a return to more normal utility activity. Also, as shown on DOD 208, page 2, SO's dividend growth rate, which was 2% historically, is expected to

increase substantially to a 4% rate of growth in the future—indicating an expectation for higher dividend growth that exceeds the sustainable growth projection. Earnings growth rate data available from Value Line indicate that investors can expect the same growth rate in the future (3%) to that which has existed over the past five years, both of which are below projected dividend growth, but approximate sustainable growth projections. However, Reuters and Zack's (investor advisory services that poll institutional analysts for growth earnings rate projections) project higher earnings growth rates for SO—4.57% and 4.0%, respectively—over the next five years.

SO's projected sustainable growth was above 4% historically, dividend growth is projected to average 4% and book value growth has been below that level in the past but is projected to approximate that level in the future. Earnings growth projections range from 3% to 4.6%. The average of Value Line's projected earnings, dividend and book value growth projections for this company is 4%. A long-term sustainable growth rate of 4.0% is a reasonable expectation for SO.

Q. IS THE INTERNAL (B X R) GROWTH RATE THE FINAL GROWTH RATE YOU USE IN YOUR DCF ANALYSIS?

A. No. An investor's sustainable growth rate analysis does not end upon the determination of an internal growth rate from earnings retention. Investor expectations regarding growth from external sources (sales of stock) must also be considered and examined. For SO, page 2 of DOD-207 shows that the number of outstanding shares increased at a 1% rate over the most recent five-year period. However, Value Line expects the number of shares outstanding to increase more rapidly through the 2010-2012 period, bringing the share growth rate up to 1.5% by that time. An expectation of share growth of 1.25% is reasonable for this company.

As shown on page 1 of DOD-208, because SO is currently trading at a market price that is greater than book value, issuing additional shares will increase investors' growth rate expectations. Multiplying the expected growth rate in shares outstanding by (1-(Book Value/Market Value)), increases the long-term DCF growth rate for SO by 67 basis

points.[21]

I have included the details of my growth rate analyses for SO as an example of the methodology I use in determining the DCF growth rate for each company in the electric industry sample. A description of the growth rate analyses of each of the companies included in my sample groups is set out in DOD 202. DOD 208, page 1 attached to this testimony shows the internal, external and resultant overall growth rates for the electric utility companies analyzed.

Q. HAVE YOU CHECKED THE REASONABLENESS OF YOUR GROWTH RATE ESTIMATES AGAINST OTHER, PUBLICLY AVAILABLE, GROWTH RATE DATA?

A. Yes. Page 2 of DOD 208 shows the results of my DCF growth rate analysis as well as 5-year historic and projected earnings, dividends and book value growth rates from Value Line, earnings growth rate projections from Reuters, the average of Value Line and Reuters growth rates and the 5-year historical compound growth rates for earnings, dividends and book value for each company under study. Also shown are projected earnings growth rates from Zack's (another investor service that polls sell-side analysts for earnings growth projections).

My DCF growth rate estimate for all the electric utility companies included in my analysis is 5.70%. This figure is higher than Value Line's projected average growth rate in earnings, dividends and book value for those same companies (4.93%) and is well above the five-year historical average earnings, dividend and book value growth rate reported by Value Line for those companies (2.23%). My growth rate estimate for the electric companies under review is similar to Value Line's average earnings growth rate projection (5.87%), but below other earnings growth rate projections—7.3% (Reuters) and 7.6% (Zack's). Also, my growth rate estimate is well above the projected dividend growth rate of the sample companies, 4.73%.

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[21] As explained in DOD 201 attached to this testimony, according to Gordon's original DCF formula the factor that accounts for additional growth due to sales of stock is "s" the rate of increase in shares outstanding, times "v" the equity accretion rate, defined as (1-M/B). For the electric utilities under study, the "sv" term adds an additional 57 basis points to the DCF cost of equity capital.

Q. DOES THIS CONCLUDE THE GROWTH RATE PORTION OF YOUR DCF ANALYSIS?

A. Yes, it does.

Q. HOW HAVE YOU CALCULATED THE DIVIDEND YIELDS?

A. I have estimated the next quarterly dividend payment of each firm analyzed and annualized them for use in determining the dividend yield. If the quarterly dividend of any company was expected to be raised in the next quarter (2nd or 3rd quarter of 2007), I increased the current quarterly dividend by (1+g). For the utility companies in the sample groups, a dividend adjustment was necessary only for PNM Resources.

The next quarter annualized dividends were divided by a recent daily-average closing average stock price to obtain the DCF dividend yields. I use the most recent six-week period to determine an average stock price in a DCF cost of equity determination because I believe that period of time is long enough to avoid daily fluctuations and recent enough so that the stock price captured during the study period is representative of current investor expectations.

DOD-209 contains the market prices, annualized dividends and dividend yields of the utility companies under study. DOD-209 indicates that the average dividend yield for the sample group of electric companies is 3.58%. The year-ahead dividend yield projection for the electric utility sample group published by Value Line is also 3.56% (Value Line, *Summary & Index*, May 25, 2007). By that measure, my dividend yield calculation is representative of investor expectations.

Q. WHAT IS YOUR COST OF EQUITY CAPITAL ESTIMATE FOR THE ELECTRIC UTILITY COMPANIES, UTILIZING THE DCF MODEL?

A. DOD-210, shows that the average DCF cost of equity capital for the group of electric utilities is 9.29%.

B. CORROBORATIVE EQUITY COST ESTIMATION METHODS

Q. IN ADDITION TO THE DCF, WHAT OTHER METHODS HAVE YOU USED TO ESTIMATE THE COST OF EQUITY CAPITAL FOR HECO?

A. To support and test the results of my DCF analysis, I have used three additional methods to estimate the cost of equity capital for a group of firms similar in investment risk to HECO. The three methodologies are: 1) the Capital Asset Pricing Model (CAPM), 2) the Modified Earnings-Price Ratio (MEPR) analysis, and 3) the Market-to-Book Ratio (MTB) analysis. The similar risk sample group of integrated electric firms analyzed with these three methods is the same as that selected for the DCF analysis, discussed previously. The theoretical details of each of those analyses are contained in DOD-203, attached to this testimony. The calculations and data supporting the results of each of these models are shown in DOD-211 through DOD-214.

DOD-211 shows the detail regarding the CAPM analysis. The average beta coefficient for the electric utility sample group published by Value Line is 0.92. As explained in DOD-203, that average beta is unusually high for electric utilities and overstates the relative risk of that group. Nevertheless, using that average beta, DOD-211 shows a CAPM cost of capital for the electric companies ranging from 9.45% to 10.83%, with a mid-point of 9.85%. Only the lower end of that range is likely to be representative of investors' required return for electric utilities.

DOD-212 and 213 show the theoretical basis and the data and calculations, respectively, for the Modified Earnings Price Ratio (MEPR) analysis. The MEPR analysis indicates a current cost of equity capital for electric companies in a narrow range from 8.52% to 8.63%. Finally, DOD-214, attached to this testimony, contains the supporting detail for the Market-to-Book Ratio (MTB) analysis, which indicates a cost of equity capital for the electric utility companies ranging from 9.51% (near-term) to 9.29% (long-term).

C. SUMMARY

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR EQUITY CAPITAL COST ANALYSES FOR THE SAMPLE GROUP OF SIMILAR-RISK ELECTRIC UTILITY COMPANIES.

A. My analysis of the cost of common equity capital for the sample group of electric utility companies is summarized in the table below.

Table I.

METHOD	Electric Utility Companies
DCF	9.29%
CAPM	9.45%/10.83%
MEPR	8.25%/8.63%
MTB	9.29%/9.51%

For the electric utility sample group, the DCF result is 9.29%. In addition, the corroborating cost of equity indications (MEPR, MTB, and CAPM), indicate that DCF result is reasonable. Averaging the lowest and highest results of all the corroborative analyses for the electric companies produces an equity cost range of 9.00% to 9.66%, with a mid-point of 9.33%, 4 basis points above the DCF result.

Therefore, weighing all the evidence presented herein, my best estimate of the cost of equity capital for a company like HECO, facing similar risks as this group of electric utilities, ranges from 9.00% to 9.75%, with a mid-point of 9.375%.

Q. DOES YOUR EQUITY COST ESTIMATE INCLUDE AN INCREMENT FOR FLOTATION COSTS?

A. No. My equity cost estimate does not contain an explicit adjustment for costs associated with public issuances of common stock, which are commonly referred to as flotation costs.

Q. CAN YOU PLEASE EXPLAIN WHY AN EXPLICIT ADJUSTMENT TO THE COST OF EQUITY CAPITAL FOR FLOTATION COSTS IS UNNECESSARY?

A. An explicit adjustment to "account for" flotation costs is unnecessary for several reasons. First, it is often said that flotation costs associated with common stock issues are exactly like flotation costs associated with bonds. That is not a correct statement because bonds have a fixed cost and common stock does not. Moreover, even if it were true, the current relationship between the electric utility sample group's stock price and its book value would indicate a flotation cost reduction to the market-based cost of equity, not an increase.

When a bond is issued at a price that exceeds its face (book) value, and that difference between market price and the book value is greater than the flotation costs incurred during the issuance, the embedded cost of that debt (the cost to the company) is *lower* than the coupon rate of that debt.

In the current economic environment for the electric utility common stocks studied to determine the cost of equity in this proceeding, those stocks are selling at a market price 83% above book value. (DOD-208, p. 1) The difference between the market price of electric utility stock and book value dwarfs any issuance expense the companies might incur. If common equity flotation costs were exactly like flotation costs with bonds and if an explicit adjustment to the cost of common equity were, therefore necessary, then the adjustment should be downward, not upward.

Second, flotation cost adjustments are usually predicated on the prevention of the dilution of stockholder investment. However, the reduction of the book value of stockholder investment due to issuance expenses can occur only when the utility's stock is selling at a market price at or below its book value. As noted, the companies under review are selling at a substantial premium to book value. Therefore, every time a new share of that stock is sold, existing shareholders realize an *increase* in the per share book value of their investment. No dilution occurs, even without any explicit flotation cost allowance.

Third, the vast majority of the issuance expenses incurred in any public stock offering are "underwriter's fees" or "discounts." Underwriter's discounts are not out-of-pocket expenses for the issuing company. On a per share basis, they represent only the

difference between the price the underwriter receives from the public and the price the utility receives from the underwriter for its stock. As a result, underwriter's fees are not an expense incurred by the issuing utility and recovery of such "costs" should not be included in rates.

In addition, the amount of the underwriter's fees are prominently displayed on the front page of every stock offering prospectus and, as a result, the investors who participate in those offerings (e.g., brokerage firms) are quite aware that a portion of the price they pay does not go to the company but goes, instead, to the underwriters. By electing to buy the stock with that understanding, those investors have effectively accounted for those issuance costs in their risk-return framework by paying the offering price. Therefore, they do not need any additional adjustments to the allowed return of the regulated firm to "account" for those costs.

Fourth, my DCF growth rate analysis includes an upward adjustment to equity capital costs which accounts for investor expectations regarding stock sales at market prices in excess of book value, and any further explicit adjustment for issuance expenses related to increases in stock outstanding is unnecessary.

Fifth, research has shown that a specific adjustment for issuance expenses is unnecessary.[22] There are other transaction costs which, when properly considered, eliminate the need for an explicit issuance expense adjustment to equity capital costs. The transaction cost that is improperly ignored by the advocates of issuance expense adjustments is brokerage fees. Issuance expenses occur with an initial issue of stock in a primary market offering. Brokerage fees occur in the much larger secondary market where pre-existing shares are traded daily. Brokerage fees tend to increase the price of the stock to the investor to levels above that reported in the Wall Street Journal, i.e., the market price analysts use in a DCF analysis. Therefore, if brokerage fees were included in a DCF cost of capital estimate they would raise the effective market price, lower the dividend yield and lower the investors' required return. Under a symmetrical treatment, if transaction costs that, supposedly, raise

[22] "A Note on Transaction Costs and the Cost of Common Equity for a Public Utility," Habr, D., National Regulatory Research Institute Quarterly Bulletin, January 1988, pp. 95-103.

the required return (issuance expenses) are included, then those costs that lower the required return (brokerage fees) should also be included. As shown by the research noted above, those transaction costs essentially offset each other and no specific equity capital cost adjustment is warranted.

Q. IF THE COMMISSION APPROVED THE COMPANY'S REQUEST FOR A 30 BASIS POINT ADDITION TO THE COST OF EQUITY IN THIS PROCEEDING HOW MUCH WOULD IT COST HECO's HAWAII RATEPAYERS EVERY YEAR?

A. According to the Company's response to DOD-IR-46, a 30 basis point increase in the allowed return in this proceeding would cost HECO's ratepayers $4 Million every year. That is an unnecessary expense that would, in effect, be an economically inefficient tax on ratepayers.

Also, in order for the Company to actually incur flotation cost of $4 Million annually (assuming that such costs are 5% of any equity offering), HEI would have to issue $80 Million in common equity every year [$80 Mill. X 5% = $4 Mill.], infuse that common equity to HECO, and assign the flotation costs to HECO. However, that scenario does not appear in the financial projections provided to the bond rating agencies by HEI (DOD-IR-13). Simply put, allowing an increase in the cost of equity for flotation costs would cause the Company's ratepayers to shoulder costs that the Company, itself, does not expect to incur.

Q. ARE THERE OTHER FACTORS TO BE CONSIDERED BEFORE DETERMINING A POINT-ESTIMATE FOR HECO'S UTILITY OPERATIONS?

A. Yes, the capital structure I recommend for ratesetting purposes for HECO contains a 52% common equity ratio. The average common equity ratio for my sample group of electric companies used to estimate the cost of equity is 44%. On that basis, HECO has lower financial risk than the sample group and a return below the mid-point of the range would be appropriate. In this instance, I believe an equity capital cost rate for HECO of 9.25%, which

would represent a decrement of 12.5 basis points for the difference in leverage, would be both reasonable and conservative.

Q. WHAT IS THE OVERALL COST OF CAPITAL FOR HECO'S ELECTRIC UTILITY OPERATIONS, BASED ON AN ALLOWED EQUITY RETURN OF 9.25%?

A. DOD-215, page 1, attached to my testimony shows that an equity return of 9.25%, operating through the Company's requested capital structure of 52.0% common equity, 1.82% preferred stock, 2.58% hybrid securities, 37.87% long-term debt, and 5.72% short-term debt produces an overall return of 7.70% for HECO. DOD-215, page 1, also shows that a 7.70% overall cost of capital affords the Company an opportunity to achieve a pre-tax interest coverage level of 4.23 times.

According to HECO's 2006 S.E.C. Form 10-K (Exhibit 12), the pre-tax interest coverage over the past three years has averaged 3.41x and has ranged from 3.27x to 3.60x. The return I recommend would allow the Company the opportunity to improve its historical average interest coverage. Therefore, the equity return I recommend fulfills the legal requirement of Hope and Bluefield of providing the Company the opportunity to earn a return which is commensurate with the risk of the operation and serves to support and maintain the Company's ability to attract capital.

Q. HAVE YOU ALSO EXAMINED WHAT CASH FLOW COVERAGES YOUR OVERALL RETURN RECOMMENDATION WOULD ENGENDER?

A. Yes. Page 2 of DOD-215 shows that, based on my recommended 9.25% return on equity, an overall return of 7.70%, the Company would achieve current bond rating benchmarks commensurate with those indicated for a "BBB" bond rating.

A Funds From Operations (FFO) interest coverage of 3.6x is produced by using my recommendation for HECO. For a utility with HECO's business ranking of 5, S&P's benchmarks indicate that an FFO/interest coverage ranging from 2.8x to 3.8x is appropriate for a "BBB" bond rating. By this measure, the return I recommend supports the Company's financial position.

Another bond rating benchmark that S&P uses is debt-to-total capital (effective debt ratio). Page 2 of DOD-215 also indicates that the effective debt ratio for HECO is 55.51%. That effective debt ratio includes all of the debt capital included in my recommended ratemaking capital structure as well as the debt equivalents attributable to HECO's purchased power obligations.[23] S&P indicates that in order to achieve a "BBB" rating, a company with a business position of "5" should have an effective debt ratio ranging from 50% to 60%. With this metric, HECO's adjusted 55.5% effective debt ratio is well within the range appropriate for a "BBB" rating.

Finally, S&P also indicates that, for a utility with a business risk profile of 5, a FFO/total debt ratio of 15% to 22% is appropriate for a "BBB" bond rating. My recommendation in this proceeding affords the Company an opportunity to achieve an FFO/total debt ratio of 19% (including imputed interest associated with purchased power obligations), again well within the range necessary for a "BBB" rating.

In summary, the Company's current bond rating is "BBB" by Standard & Poor's and my return recommendation for HECO's operations would enable the Company to maintain that bond rating, according to a cash flow benchmark analysis. Therefore, the overall cost of capital recommendation in this proceeding affords the Company an opportunity to maintain its financial position and, on that basis, fulfills the requirements of Hope and Bluefield.

[23] The purchased power debt imputations are based on the workpapers filed with Company witness Sekimura's Direct Testimony (HECO-T-19), which use a 30% risk factor. In response to DOD-IR-68, the Company increased that risk factor to 50%, based on its interpretation of a S&P publication. However, when asked in DOD-IR-91 to provide definitive support from S&P that such a change in risk factor had, indeed, occurred, the Company did not provide that support.

V. COMPANY COST OF CAPITAL TESTIMONY

Q. HOW HAS DR. MORIN ESTIMATED THE COST OF EQUITY IN THIS PROCEEDING?

A. Dr. Morin has analyzed the cost of equity capital for HECO using four risk premium analyses (four CAPM analyses, and six Risk Premium analyses) and four DCF analyses. The results of those two types of methodologies are very different. The average equity cost estimate of his four risk premium analyses is 11.25%. The average DCF equity cost estimate reported by Dr. Morin in this proceeding is 10.4%.[24]

The average of all of Dr. Morin's results is 10.8%. However, in determining the average of his results, Dr. Morin elects to give 2/3 weight to his risk premium results and 1/3 to his DCF results, producing an average of 11.0% (see HECO T-18, p. 64). Moreover, as I discussed in Section II of this testimony, there is a large body of recent research that indicates the historical realized risk premiums used by Dr. Morin overstate investors' current return expectations. Therefore, equity cost estimates based on risk premium techniques are not reliable as primary indicators of the cost of capital.

Dr. Morin acknowledges in his Direct Testimony in this proceeding that the DCF is "appropriate,"and that some regulatory bodies place exclusive reliance on the DCF to estimate equity capital costs. (HECO T-18, pp. 15) For example, during the 1980s and early 1990s the Federal Energy Regulatory Commission instituted a generic determination of the cost of equity capital for the electric utility industry. Following literally years of comments and reply comments from many participants regarding different equity cost estimation methods, the FERC selected the constant growth DCF model as the single best method with which to estimate the cost of equity capital.[25]

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[24] In his reported DCF results, Dr. Morin has included unnecessary additions to the market-based cost of equity. Absent flotation costs and an unnecessary adjustment to dividend yields, Dr. Morin's DCF results average 9.9% [(9.3%+10.2%+10.3%+9.9%)/4].

[25] FERC anticipated that an administrative determination of an appropriate industry-wide cost of equity would limit debate on that issue in rate proceedings. It did not. Because FERC staff was devoting resources to producing a generic cost of equity estimate and continuing to litigate the issue in every rate proceeding, the Commission ultimately discontinued the generic rulemaking proceeding.

Also, a study of regulatory commission equity cost estimation methods by the National Association of Regulatory Utility Commissioners, cited by Dr. Morin, found that while nearly every regulatory body in the U.S. and Canada listed DCF as a methodology on which it relied, only 11 listed CAPM.[26] During cross-examination in a rate case in Georgia, Dr. Morin referenced that study and noted that DCF use was "almost unanimous," while no Commission relied solely on the CAPM. (Atlanta Gas Light Company, Georgia Public Service Commission Docket No. 18638-U, Tr. 500-501).

However, in his testimony in this proceeding, Dr. Morin de-emphasizes his reliance on the DCF and places more reliance on risk premium methods. While acknowledging that all cost of equity methodologies are undertaken with theoretical assumptions that do not mirror reality, Dr. Morin elects to devote considerable testimony to the DCF assumptions and criticisms, but neglects to discuss in detail the theoretical assumptions and application problems of risk premium methods, which are substantial. The difficulties with risk premium models that Dr. Morin fails to discuss are the very reason why those methodologies tend to be less reliable indicators of the cost of equity capital than the DCF. Dr. Morin's testimony de-emphasizes the most widely-used equity cost estimation technique, the DCF, which provides the lower results, and emphasizes the results of more unreliable risk premium methods, which provide higher equity cost estimates.

Q. PLEASE EXPLAIN WHY, CONTRARY TO DR. MORIN'S TESTIMONY, IT IS REASONABLE TO BELIEVE THAT THE DCF IS A RELIABLE INDICATOR OF EQUITY CAPITAL COSTS IN THE CURRENT CAPITAL MARKET ENVIRONMENT.

A. At page 23 of his Direct Testimony, Dr. Morin opines that "several fundamental structural changes have transformed the energy utility industry since the standard DCF model and its assumptions were developed." While that is certainly true, it is also true for all other market-based equity cost estimation methods such as the CAPM, which was developed

[26] National Association of Regulatory Utility Commissioners, "Utility Regulatory Policy in the United States and Canada," Compilation 1994-1995.

about the same time as the DCF (1960s and 1970s). Therefore, Dr. Morin cannot credibly claim the DCF is flawed because it was developed during another economic era, while simultaneously placing more weight on an econometric model developed at the same time. Moreover, cost of equity methods do not model particular economic conditions, rather they model the manner in which investors make decisions. Therefore, unless Dr. Morin can show that the DCF is no longer a reasonable proxy for the manner in which investors value stocks (i.e., if investors do not believe that the current stock price is the present value of the future income stream generated by that stock)—and he has made no attempt to do so—his claim that the DCF is unreliable is not supported.

Dr. Morin's claim of DCF ineffectiveness fails on other grounds as well. The energy industry has been in some sort of "turmoil" consistently for the past thirty years. Events such as the oil embargo of the mid-1970s, a 21% prime rate in the early 1980s, the enormous nuclear building program for electric utilities—made doubly costly by the incident at Three Mile Island, the stock market crash of 1987, the gas "bubble," force majeure with the pipeline industry, stock prices well below book value, dividend cuts, mergers and acquisitions, poorly performing unregulated investment, and the beginnings of policy discussions regarding deregulation of the generation function all roiled the industry and investors. These events occurred through the mid-1990s. During that period, the DCF model was the pre-eminent cost of equity estimation method used to set utility rates, and Dr. Morin relied on the DCF during that time. The current changes in the utility industry are simply a continuation of the evolution of the industry and, in no way, signal the unreliability of the DCF, as Dr. Morin's testimony implies.

Second, it was certainly true, at some point in the late 1990s, prior to the advent of the deregulation of electric utility generation in some jurisdictions, that there was uncertainty as to the direction of a portion of the industry that was subject to de-regulatory pressures. However, following the California "experiment" and confessions of energy trading malfeasance, the uncertainties pertaining to the deregulation of the electric utility industry have been greatly reduced. The deregulation juggernaut has effectively ground to a halt with some jurisdictions embracing that paradigm, while most have not.

Those jurisdictions that have deregulated have done so without the attendant turmoil that occurred in California and have lowered uncertainty-related risks in that regard. It is important to note that, at this point, the "structural changes" afoot in that industry have been discounted in current stock prices by an efficient market and serve no impediment to the accurate estimate of the cost of equity capital by the DCF. Certainly, the current level of uncertainty regarding electric utilities is no worse than that which existed, for example, during the extremely high interest rates and nuclear building programs of the early 1980s. Therefore, if the DCF provided accurate equity cost estimates in the 1970s, 1980s and 1990s, and Dr. Morin's prior focus on that model indicates that he believed it did, it does so today.

Q. DOES DR. MORIN TESTIFY IN THIS PROCEEDING THAT THE DCF UNDERSTATES THE COST OF EQUITY WHEN MARKET PRICES ARE ABOVE BOOK VALUE AND OVERSTATES THE COST OF EQUITY WHEN MARKET PRICES ARE BELOW BOOK VALUE?

A. Yes.

Q. HAS THAT ALWAYS BEEN HIS POSITION?

A. No. Dr. Morin's first text on the cost of capital, Utilities' Cost of Capital[27], was published in 1984, and was conceived and written during a difficult time period for electric utilities in which interest rates were very high and utility market prices were generally below book value. There is nothing in that text that indicates that when market prices are below book value (as they were at that time), the DCF overstates the cost of equity (as is now Dr. Morin's claim; HECO T-18, p. 19, ll. 8, 9). In fact, Dr. Morin reached the exact opposite conclusion in 1984. At page 98 of his 1984 text, Dr. Morin states that the application of the standard DCF model to a public utility whose market-to-book ratio was below one would result in a "downward-biased estimate of the cost of equity."

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[27] Morin, R. Utilities' Cost of Capital, Public Utilities Reports, Inc., Arlington, VA, 1984.

When utility stock prices were generally below book value, Dr. Morin is on record stating that the DCF understates the cost of capital because market prices are below book value. Now that utility stock prices are generally above book value, Dr. Morin is on record stating that the DCF understates the cost of capital because market prices are above book value. This theoretical inconsistency regarding the fundamentals of the DCF, in my view, makes Dr. Morin's current testimony on this topic suspect.

Q. IS THERE AN EXAMPLE DR. MORIN USES TO SUPPORT HIS CURRENT LOGIC AGAINST RELIANCE ON HIS DCF RESULTS?

A. Yes. At pages 19 and 20 of his Direct Testimony in this proceeding, Dr. Morin sets out the following numerical example:

	Situation 1	Situation 2	Situation 3
1 Initial Purchase Price	$25.00	$50.00	$100.00
2 Initial Book Value	$50.00	$50.00	$50.00
3 **Initial M/B**	**0.50**	**1.00**	**2.00**
4 **DCF Return 10% = 5% + 5%**	**10.00%**	**10.00%**	**10.00%**
5 Dollar Return	$5.00	$5.00	$5.00
6 Dollar Dividends 5% Yield	$1.25	$2.50	$5.00
7 Dollar Growth 5% Growth	$3.75	$2.50	$0.00
8 **Market Return**	**20.00%**	**10.00%**	**5.00%**

His explanation of the "impact" of market-to-book ratios on the DCF cost of equity in "Situation 3"(when market prices are above book value, as they are now) proceeds as follows:

> The DCF cost rate of 10%, made up of a 5% dividend yield and a 5% growth rate, is applied to the book value rate base of $50 to produce $5.00 of earnings. Of the $5.00 of earnings, the full $5.00 are required for dividends to produce a dividend yield of 5% on a stock price of $100.00, and no dollars are available for growth. The investor's return is therefore only 5% versus his required return of 10%. A DCF cost rate of 10%, which implies $10.00 of earnings, translates to only $5.00 of earnings on book value, or a 5% return. (HECO T-18, p. 19, l. 20 through p. 20, l. 1)

In his testimony in this proceeding, Dr. Morin elects not to discuss "Situation 1" in which market prices are below book value and the DCF, supposedly, overstates the cost of equity. Of course, as I noted previously, during the time period when market prices were actually below book value, Dr. Morin expressed no concerns that the DCF overstated the cost of equity due to differences in market price and book value—he expressed the opposite view.

Q. DOES DR. MORIN'S NUMERICAL EXAMPLE, SET OUT ABOVE, SUPPORT HIS THESIS THAT THE DCF IS INACCURATE WHEN MARKET PRICES ARE DIFFERENT FROM BOOK VALUE?

A. No; that position is without theoretical merit. In attempting to show that the DCF estimates the cost of equity incorrectly when market prices are different from book value, Dr. Morin has created a hypothetical situation that cannot exist in reality and is contrary to one of the most fundamental precepts in finance.

In attempting to show that the DCF understates the cost of capital when market prices are above book value, Dr. Morin's "Situation 3" example posits a firm that has an allowed return of 10% (which is assumed to be determined by the DCF), a book value of $50, and for which investors are paying a stock price equal to twice book value ($100). That company will earn $5 on its rate base investment (10% allowed return x $50 rate base/book value), and that $5 return represents only a 5% return to the investors that paid $100 for the stock. Dr. Morin, through this example, ostensibly concludes that the DCF does not provide the investors' required 10% return (the return assumed to be provided by the DCF) when it is applied to a rate base (book value) that is smaller than the market price. This is a spurious conclusion for two reasons.

First, if the investor's required return is actually 10% (which appears to be Dr. Morin's assumption) and the utility is expected to earn a 10% return on its book value of $50—no investor would pay twice book value for that stock. Imagine a broker trying to sell a stock to an investor who demands a 10% return: "I've got a stock for you that's going to pay you $5 annually, but each share will cost you $100. What do you say?" No investor

would knowingly pay $100 for a stock that will earn $5 when he or she requires a 10% return for that type of stock. Dr. Morin's "example" defies fundamental financial logic. As Dr. Morin, himself, confirms:

> "Investors will not provide equity capital at the current market price if the earnable return on equity is below the level they require given the risks of an equity investment in the utility." (HECO T-18, p. 5, ll. 7-9)

Second, the only reason for an investor to pay $100 for a stock that will provide a $5 income stream is if that investor requires a 5% return for that type of stock. In Dr. Morin's example if we take the 10% number to be the allowed return (the expected return on the $50 rate base), and the investor's cost of capital to be 5% (a DCF result derived from a 5% dividend yield and 0% growth), then, his "Situation 3" numerical example makes economic sense. If the investor's required return is 5% and the stock in question is expected to pay a 10% return on a $50 book value, then, *and only then*, is the $100 stock price rational.

Therefore, the only situation under which the numerical conditions set out in Dr. Morin's example can exist is one that conforms to the widely accepted relationship between market price, book value, ROE and the cost of capital.[28] Namely, when the expected return (r = 10% in "Situation 3,"above) exceeds the investors' required return (K = 5% in "Situation 3," above) the market price (P = $100) will exceed the book value (B = $50).

In summary, Dr. Morin's current numerical example, which purports to show that the DCF understates the cost of equity when market prices are above book value, does not do so. Instead, under the only circumstance that makes economic sense, his example shows that when utility market prices are significantly above book value, the investors' required return (the cost of equity capital) is below the ROE expected to be earned by those

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[28] Gordon, M.J., The Cost of Capital to a Public Utility, MSU Public Utilities Studies, East Lansing, Michigan, 1974, pp., 63-64; Kolbe, Read, Hall, The Cost of Capital, Estimating the Rate of Return for Public Utilities, 25-33 (1986); Lawrence Booth, ("The Importance of Market-to-Book Ratios in Regulation," NRRI Quarterly Bulletin, Vol. 18, No. 4, at 415-16 (Winter 1997).

companies. That long-standing truism indicates that Dr. Morin's recommended equity return of 11.25% cannot be an accurate estimate of HECO's cost of equity capital.

Q. DID THE ORIGINATOR OF THE DCF, PROFESSOR MYRON GORDON, INDICATE THAT THE DCF WOULD PROVIDE EQUITY COST ESTIMATES THAT WERE SKEWED DOWNWARD (UPWARD) IF THE MARKET PRICE WAS ABOVE (BELOW) BOOK VALUE?

A. No, he did not. Professor Gordon was certainly aware that utility market prices would differ from book value, and specifically discussed the implications of market prices that are different from book value. Gordon proved that a market price well above book value indicated that the expected return (the expected return on book value—the ROE) would be above the cost of capital.[29] Importantly, there is no discussion in Gordon's seminal DCF texts regarding the ability of the DCF to accurately estimate the cost of equity capital based on differences between market price and book value. When asked in DOD-IR-28 to provide cites to "provide support from the financial literature on which the DCF is based…that supports the contention that the DCF provides an accurate estimate of the cost of equity 'only when stock price and book value are reasonably similar,'" Dr. Morin provided no such support. Simply put, there is no structural "problem" with the DCF that would cause the model to inaccurately estimate the cost of equity when market prices are different from book value and Dr. Morin's claims to the contrary are incorrect.

Q. AT PAGES 24 AND 25 OF HIS DIRECT, DR. MORIN DISCUSSES CHANGING PRICE-EARNINGS RATIOS AS AN IMPEDIMENT TO DCF RELIABILITY. DOES THE FACT THAT UTILITY P/E RATIOS HAVE INCREASED MEAN THAT THE DCF IS NOT AN ACCURATE MEASURE OF THE COST OF EQUITY?

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[29] In the current capital market, the electric utilities in my sample group have a median market to book ratio of 1.8 (DOD-208) and an expected return on book equity (ROE) of 11% (DOD-213). Gordon's conclusion would be that the cost of equity must be well below 11%. A DCF estimate of 9.29% is consistent with Gordon's theory.

A. No. Dr. Morin, at page 25 of HECO T-18 shows a graph of utility P/E ratios that have increased from 1990 through 2006. What that shows, literally, is that investors were willing to pay substantially more for a dollar of utility earnings in 2006 than they were in 1990—utility earnings have become more valuable to investors. The flip side of that reality is that the cost of capital to the utility—the return investors require—has declined. As I show in DOD-203, the inverse of the price-earnings ratio, the earnings-price ratio can be a proxy for the cost of equity capital.[30] If the P/E ratio is increasing that means the E/P ratio—a measure of the cost of equity—is declining. Therefore, while it would certainly be true that a utility cost of capital estimate made in 1990 would not be appropriate now (it would be too high), that does not mean that the DCF would not be able to accurately estimate the current cost of equity.

Q. DOESN'T DR. MORIN PROVIDE A QUOTE FROM "ONE OF THE LEADING EXPERTS ON REGULATION" THAT DISCUSSES THE "DANGERS" OF RELYING SOLELY ON THE DCF?

A. Yes, he does. However, Dr. Morin fails to provide the Commission the opinion of that same "leading expert" regarding the CAPM, which follows immediately after the quote he chose to cite in his testimony. At page 18 of his Direct Testimony, Dr. Morin quotes from Dr. Charles Phillips' text The Regulation of Public Utilities Theory and Practice. The very next paragraph following the text provided by Dr. Morin reads as follows:

> The CAPM holds that the cost of equity capital or expected return on a utility's common equity is equivalent to that on a riskless security plus a risk premium related to the risk inherent in a particular utility's stock; that is, the model combines risk and return in a single measure.
>
> * * *
>
> Despite its appeal, the CAPM also has both theoretical and practical problems. The theoretical issues include the reliability of the model's basic assumptions and the static nature of the model. The practical problems surround the beta coefficient, "the only variable in the CAPM equation

[30] Brealey, R., Meyers, S., Allen, F., Principles of Corporate Finance, 8th Edition, McGraw-Hill, Irwin, Boston MA, 2006, pp. 72-73.

> that is unique to the particular firm for which the cost of equity capital is being determined." They include: How should beta be measured—stock market price alone or total return on investment (i.e., dividends plus capital gains)? What period of time should be used for such measurement? What is the proper measure of stock market performance (e.g., Dow Jones index, Standard & Poor's index, etc.)? What is the proper measure of the risk-free return (e.g. Treasury notes or Treasury bonds)? Finally, the evidence suggests that betas are unstable over time and that they move in the opposite direction from investors' perceptions of risk. These issues have led some to conclude that the CAPM, at least at this stage in its development, "is inaccurate, incomplete, and unreliable as a measure of a firm's equity cost of capital."(Phillips, C.F.,The Regulation of Public Utilities Theory and Practice, Public Utilities Reports, Arlington VA, 1993, 396, 397, footnotes omitted)

Q. ARE THE ENABLING ASSUMPTIONS OF RISK PREMIUM ANALYSES RESTRICTIVE?

A. Yes. The assumptions that enable the existence of the CAPM analysis are far more restrictive than those that support the DCF. At page 16 of his Direct Testimony, Dr. Morin references Dr. Eugene Brigham as a "widely respected scholar of finance academician." Dr. Brigham provides a concise list of the assumptions that underlie the Capital Asset Pricing Model:

> 1. All investors think in terms of a single period, and they choose among alternative portfolio's expected return and standard deviation over that period.
> 2. All investors can borrow or lend an unlimited amount of money at a given risk-free rate of interest, k_{RF}, and there are no restrictions on short sales of any asset.
> 3. All investors have identical estimates of the expected values, standard deviations, and correlations of returns among all assets; that is, investors have "homogeneous expectations."
> 4. All assets are perfectly divisible and are perfectly marketable at the going price.
> 5. There are no transaction costs.
> 6. There are no taxes.
> 7. All investors are price takers (that is, all investors assume that their own buying and selling activity will not affect market prices).

8. The quantities of all assets are given and fixed. (Brigham, E, Gapenski, L., Intermediate Financial Management, 5th Ed., Dryden Press, Fort Worth TX, 1994, p. 68).

Those restrictive CAPM assumptions are also shown at page 170 of Dr. Morin's New Regulatory Finance.[31]

It should be clear, even to the most casual observer, that many of the assumptions on which the CAPM is predicated are violated in applying the CAPM to the determination of the cost of capital of a particular type of security. All investors are not single-period investors; all investors can't borrow and lend unlimited amounts of money at the risk-free rate; all investors do not have identical return expectations. Furthermore, all assets are not perfectly divisible; there are taxes; there are transaction costs; and many large institutional investors are acutely aware that buying and selling large amounts of any particular stock may affect stock prices. Each of these everyday stock market realities violates at least one of the assumptions on which the CAPM is grounded.

There are broader theoretical questions regarding the CAPM that I discuss in detail in DOD-203 attached to this testimony. For example, while analysts commonly use a broad market index (S&P 500 or NYSE) to represent "the market" in the CAPM, the model is actually assumed to consider all capital investments (bonds, art, real estate, human capital) not just stocks. Moreover, since there is no "index" for all capital investments, the "true" CAPM cost of equity is not determinable, in a strict technical sense.

The CAPM also has problems with its primary risk measure beta, which are discussed briefly in DOD-203. Although he fails to do so in his testimony in this proceeding, Dr. Morin discussed many of the problems with beta in his 1994 text:

[31] In defense of his reliance on CAPM, Dr. Morin takes the position that if the CAPM is considered to be a special case of the Arbitrage Pricing Model (APM), its assumptions are less restrictive (HECO T-18, p. 26). Unfortunately, although the APM has less restrictive assumptions, it was derived after the CAPM as an attempt to solve some of the CAPM's problems and does not negate the assumptions on which the CAPM rests. Further, Dr. Morin has relied on the CAPM, not the APM to estimate the cost of equity capital (DOD-IR-36) and his reference to the latter to mollify the strict nature of the assumptions on which the CAPM rests is inappropriate.

> **Practical and Conceptual Difficulties**
> **Computational Issues.** Absolute estimates of beta may vary over a wide range when different computational methods are used. The return data, the time period used, its duration, the choice of market index, and whether annual, monthly, or weekly return figures are used will influence the final result.
> * * *
> **Beta Stability.** Several empirical studies of beta coefficients, notably by Blume (1975) and Levy (1971), have revealed the market instability of betas over time.
> * * *
> **Historical versus True Beta.** The true beta of a security can never be observed. Historically estimated betas serve only as proxies for the true beta.
> * * *
> **Relevance of Beta.** According to both financial theory and empirical evidence, betas are critical and sufficient measures of risk....But the relevance of beta as the only measure of risk remains controversial. (Morin, R. New Regulatory Finance, Public Utilities Reports, Arlington VA, 2006, pp. 71-81)

Two researchers that Dr. Morin cites for authority, Eugene Fama and Kenneth French, published findings in the early 1990s regarding beta that show that beta, the primary risk measure in the CAPM, to be essentially meaningless.[32] As Value Line noted in its *Industry Review*, March 13, 1992, Fama and French established in dramatic fashion the lack of a statistical relationship between return and beta. That finding was important because Fama's early econometric work in the 1970s on the CAPM and beta had lent credibility to the model.

For example, Fama and French found that there was little difference in the average monthly returns of stocks with high betas and stocks with low betas, while the assumption embodied in the CAPM is that the returns for those types of stocks should be substantially different. These findings led those researchers to conclude:

> In short, our tests do not support the most basic prediction of the SLB [Sharpe-Litner-Black, CAPM] model, that average returns are positively related to market ßs. (Id., p. 428)

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[32] The Cross-Section of Expected Stock Returns," The Journal of Finance, Vol. XLVII, No. 2, June 1992, pp. 427-465).

Fama and French have continued their investigation of the CAPM since their 1992 article and have postulated that a more accurate CAPM would use two additional risk measures in addition to beta. However, it is important to note that while those authors tout the superiority of their three-factor CAPM to the single-beta CAPM on theoretical grounds, they recognize that there are significant problems with any type of asset pricing model when it comes to using the model to estimate the cost of equity capital. Even in reference to their three-factor CAPM, Fama and French indicate the equity cost estimates produced are "woefully imprecise."[33] In 2004, those authors stated in the *Journal of Economic Perspectives*, that the CAPM's structural problems render the model "invalid."

> The attraction of the CAPM is that is offers powerful and intuitively pleasing predictions about how to measure risk and the relation between expected return and risk. Unfortunately, the empirical record of the model is poor—poor enough to invalidate the way it is used in applications. The CAPM's empirical problems may reflect theoretical failings, the result of many simplifying assumptions. But they may also be caused by difficulties in implementing valid tests of the model....In the end, we argue that whether the model's problems reflect weaknesses in the theory or in its empirical implementation, the failure of the CAPM in empirical tests implies that most applications of the model are invalid. (Fama, E., French, K., "The Capital Asset Pricing Model: Theory and Evidence," *Journal of Economic Perspectives*, Vol. 18, No. 3, Summer 2004, pp. 25-46)

In summary, the CAPM analysis used by Dr. Morin as a primary indicator of the current cost of common equity has very strong assumptions that violate real-world financial market conditions. Also, the fundamental risk measure on which CAPM is based (beta) has many problems—a fact discussed in detail by Dr. Morin in his text as well as by others on whom Dr. Morin relies for authority. While the CAPM remains an elegant description of capital market behavior that is widely used in academia as a theoretical framework, it has significant application problems. Although those problems do not negate its use, they do call for the use of the CAPM as a supporting equity cost estimation procedure.

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[33] Fama, French, "Industry Costs of Equity, "*Journal of Financial Economics*, 43 (1977), pp. 153-193.

Unfortunately, Dr. Morin places primary emphasis on risk premium-type models in his equity cost analysis in this proceeding.

Q. DO YOU USE THE CAPM IN DETERMINING YOUR RECOMMENDATION IN THIS PROCEEDING?

A. Yes, I do. Although the CAPM has numerous practical difficulties that can cause wide swings in the results, it remains a reasonable description of capital market behavior. I believe, with well-reasoned application of the risk-free rate, beta and a forward-looking market risk premium, it can produce reasonable estimates of the cost of equity.

Unlike Dr. Morin in this proceeding, I do not place primary reliance on the CAPM because of both the theoretical and practical implementation problems associated with the CAPM. Moreover, it is important to understand that the same "leading expert" Dr. Morin cites in downplaying the importance of DCF, also indicates the CAPM is "unreliable."[34]

Q. ARE THERE OTHER PROBLEMS RELATED TO RISK-PREMIUM ANALYSES THAT YOU HAVE NOT DISCUSSED IN THIS PORTION OF YOUR TESTIMONY?

A. Yes, there are other important concerns regarding the risk premium-type analysis on which Dr. Morin elects to rely. However, I have discussed those problems in Section II of my testimony. Simply put, historical risk premiums (the Morningstar historical return data) and the electric and gas industry risk premium data presented in HECO-1802, overstate current investor expectations. There has been much research on this issue in the financial economic literature over the past decade, which indicates that investors' current risk premium expectations are considerably lower than that indicated by historical return data.

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[34] Phillips, C.F., The Regulation of Public Utilities Theory and Practice, Public Utilities Reports, Arlington VA, 1993, 397.

Q. PRIOR TO ADDRESSING THE INFIRMATIES OF EACH OF DR. MORIN'S EQUITY COST METHODS, PLEASE EXPLAIN WHETHER THERE ARE TECHNICAL ASPECTS OF HIS ANALYSES THAT CAUSE ALL THE METHODS TO BE OVERSTATED.

A. Dr. Morin's equity cost estimate results for electric utilities averages 11%, giving risk-premium estimates 2/3 weight. Averaging all of his equity cost estimates equally produces an average of 10.8%. Dr. Morin recommends an 11.25% cost rate for HECO to account for what he believes to be the Company's higher risk.

There are technical flaws in each of his equity cost analyses that cause the results to be overstated to varying degrees, which I will discuss in detail below. However, there are two unnecessary adjustments applied to each equity cost estimate which cause Dr. Morin's average ROE results to be overstated by approximately 40 basis points (0.40%): the dividend yield adjustment and the flotation cost adjustment.

Dr. Morin's Direct Testimony and Exhibits indicate that he has added flotation costs to his equity cost estimates. His flotation cost increases his recommended return on equity by 30 basis points. As I have explained previously in my testimony, an explicit adjustment for flotation costs is unnecessary. Removing that unnecessary 30 basis point adjustment from Dr. Morin's average equity cost estimate for HECO indicates an average equity cost estimate of 10.5%, not 10.8%.

Q. YOU INDICATED THERE WERE TWO UNNECESSARY ADJUSTMENTS TO DR. MORIN'S EQUITY COST ESTIMATES. WHAT IS THE OTHER ADJUSTMENT?

A. Dr. Morin's standard DCF analysis relies on dividend yields published in Value Line. I have no concerns with the use of that source of information. In calculating his DCF dividend yields, however, Dr. Morin increases the current dividend yield by one plus the DCF growth rate. As Value Line explains to its subscribers in "A Subscribers' Guide," the dividend yield published by Value Line, is based on the "cash dividends *estimated to be declared in the next 12 months* divided by the recent [stock] price." Therefore, in adjusting

the dividend yield published by Value Line for one year's expected growth, Dr. Morin is double counting that growth.

As shown on HECO-1804 through 1807 his dividend growth adjustment (1+g) increases the cost of equity capital from 20 to 30 basis points. This represents an overstatement of the overall cost of equity of approximately 10 basis points because DCF analyses that include dividend increases represent 4 of Dr. Morin's 8 equity estimation methods. [20 basis points x 4 ÷ 8 = 10]

That 10 basis point overstatement caused by double-counting the dividend increase, combined with the inclusion of an unnecessary 30 basis flotation cost adjustment causes Dr. Morin's equity cost estimates to be overstated by approximately 40 basis points. Therefore Dr. Morin's equity cost analyses actually indicate an average cost of equity capital for HECO of 10.4%, not the 10.8% average of all of his individual estimates.

Q. HOW IS YOUR DISCUSSION OF DR. MORIN'S INDIVIDUAL EQUITY COST ESTIMATION METHODS ORGANIZED?

A. I will discuss Dr. Morin's equity cost analyses in the order they are presented in his testimony: CAPM, ECAPM, Risk Premium and the DCF.

A. CAPITAL ASSET PRICING MODEL

Q. WHAT ARE YOUR COMMENTS ON DR. MORIN'S CAPM ANALYSIS?

A. There are three factors in any CAPM cost of equity estimate: the risk-free rate, the market risk premium and the beta coefficient. Two of these elements in Dr. Morin's CAPM analysis serve to overstate the cost of equity capital—beta and the market risk premium.

Q. WHAT ARE YOUR COMMENTS REGARDING THE BETA COEFFICIENT IN DR. MORIN'S STANDARD CAPM ANALYSIS?

A. As I discuss in more detail in DOD-203, the current beta reported by Value Line for electric utilities is unusually high. Value Line betas depend on the relative volatility of the market

price of a stock to that of a market index. Over the past five years, utility stocks have been more volatile than the stocks in the broader market and the result is a dramatic and unusual increase in the average utility beta.

As Dr. Morin notes at page 78 of his most recent text, regarding the volatility of beta:

> If betas are going to be applied to determine the cost of capital through the CAPM, stability of beta is crucial. If betas are not stable, any assessment of cost of capital based on historical beta estimates may not hold true for the future period during which the new allowed rates of return will be in effect. (Morin, R., New Regulatory Finance, Public Utilities Reports, Inc., Arlington VA, 2006)

Utility betas have not been stable, and they are currently at an historically high level. Moreover, the historical stock price movements on which the current Value Line betas are based are not representative of the relative risk differences between electric utilities and the market. Therefore, because the current utility betas are overstated, the CAPM cost of equity estimates will also be overstated.

Q. WHAT ARE YOUR COMMENTS REGARDING DR. MORIN'S CALCULATION OF THE MARKET RISK PREMIUM IN HIS CAPM ANALYSIS?

A. Dr. Morin averages a long-term historical market premium provided by Morningstar and a forward-looking market premium calculated by applying a DCF analysis to a group of stocks followed by Value Line. I have two comments regarding Dr. Morin's market risk premium.

First, when using the historical Morningstar data, Dr. Morin elects to rely only on the difference between the earned return of stock and the yields of bonds. His rationale is that there have been unanticipated gains with bond investments and the historical yields (which are lower) better represent investor expectations. However, there is no analogue for stocks and the metric used by Morningstar is the earned return on either the S&P 500 or

the NYSE index. The return series would be better balanced and have more meaning for determining expectations if earned returns are used for both series.

As Dr. Morin notes at page 31 of HECO T-18, the difference between the earned return series is 6.5% (i.e., the average historical return on stocks has been 6.5% higher than the average historical return on bonds). However, Dr. Morin has elected to use 7.1% based on historical bond yields, because, as he notes in his Direct Testimony at page 32, "Ibboston Associates recommend" its use. [Note: Ibbotson Associates is now Morningstar]

However, a recent paper published by Ibbotson in the *Financial Analysts' Journal* indicates that the maximum expected market risk premium (the return equity investors expect over bond yields) is 5.9%, not the 7.1% used by Dr. Morin in his testimony.[35] In that recently published paper, Dr. Ibboston discusses the current theoretical debate over the market risk premium, which I summarized in Section II of this testimony. As Ibbotson notes the current research indicates that the market risk premium going forward ranges from 0% to a maximum of about 5% (op cit., pp. 88, 89). Ibbotson disagrees with that current research and provides his analysis of the issue, which shows a prospective market risk premium to range from 3.97% (based on a geometric average) to 5.90% (based on an arithmetic average).

The point here is simple. Dr. Morin has selected a particular historical market risk premium for his CAPM because Ibbotson recommended it, but in a more current publication, Dr. Ibbotson indicates the prospective market risk premium is 5.9% (at the upper end), not the 7.4% Dr. Morin ultimately uses in his CAPM analysis. The use of a 7.4% risk premium instead of Ibbotson's forward-looking 5.9% maximum, given the use of a 0.86 beta coefficient, would cause an overstatement in Dr. Morin's CAPM of 129 basis points. That, alone, would reduce Dr. Morin's current-yield CAPM from 11.3% to 10.01%.

Second, Dr. Morin also constructed a forward-based market risk premium based on a DCF analysis of the universe of stocks followed by Value Line. Dr. Morin advises the

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[35] Ibbotson, R., Peng, C., "Long-Run Stock Returns: Participating in the Real Economy," *Financial Analysts' Journal*, January/February 2003, pp. 88-98.

Commission to be cautious about relying on DCF estimates, yet, he bases this portion of his preferred risk premium methodology on a DCF analysis. If the DCF provides a reasonable estimate of the expected return for the entire Value Line universe of stocks, it is reasonable to believe it would provide an accurate estimate of the cost of equity for utilities. This presents a conflict of logic in Dr. Morin's testimony.

Also, Dr. Morin does not provide the details of his DCF analysis of the companies in the Value Line universe in his workpapers (DOD-IR-57). Therefore it is not possible to review the analysis that produced his 12.7% DCF estimate of the expected return for the Value Line companies. However, Value Line does publish a dividend yield and a 3 to 5-year price appreciation potential for the 1700 companies it follows. The June 1, 2007 edition of Value Lines *Summary and Index* shows a current dividend yield (for all the stocks paying dividends) of 1.6% and a 3- to 5-year appreciation potential of 35%. Assuming that price appreciation occurs during the fourth year, Value Line's projection indicates a growth rate of 7.79%. Adding that growth rate to the current dividend yield of 1.6% indicates a total return expectation of 9.39%—which is substantially different from Dr. Morin's 12.7% result. Moreover, a market risk premium based on Value Line's appreciation potential projections would be 4.5% [9.39% market return- 4.9% T-Bond yield = 4.5% market risk premium]. Using that result, based on Value Line data, produces a CAPM cost of equity estimate of 8.77% [4.9% risk free rate + 0.86 beta x 4.5% market risk premium = 8.77%].

Q. ARE THERE OTHER CONSIDERATIONS REGARDING THE MARKET RISK PREMIUM OF WHICH THIS COMMISSION SHOULD BE AWARE?

A. Yes. Because I discuss this issue in detail in DOD-203, I will only summarize it here. Historical return data can be averaged in two different ways—arithmetic averaging and geometric averaging. The former takes the sum of the returns and divides by the number of periods, and the latter measures the rate of return from the beginning of the period to the end of the period. When returns are volatile the arithmetic average is higher than the geometric average, and that is the only average that Dr. Morin has considered.

However, research has shown that there is negative autocorrelation in the historical return data, which means that periods of high returns are followed by periods of low returns and vice versa. Given that fact, the arithmetic average, which assumes strict independence of the periodic returns, provides a misleading indication of the historical average. Therefore, consideration of only the higher arithmetic mean is improper. For example, as I note in my discussion of the CAPM in DOD-203, Morningstar reports that the long-term historical average return difference between stocks and T-Bonds is 6.5%, based on the arithmetic average and 5%, based on the geometric average. Dr. Morin's risk premium analyses are overstated because he has failed to consider the geometric averages of the historical return data.

Q. DOESN'T DR. MORIN POINT TO A 2003 PAPER BY HARRIS AND MARSTON TO SUPPORT HIS 7.4% MARKET RISK PREMIUM ESTIMATE?

A. Yes, he does. However, the author of that article now has a different opinion regarding a reasonable forward-looking market risk premium.

Q. CAN YOU PLEASE EXPLAIN THAT STATEMENT?

A. Yes. Dr. Morin, Professor Felecia Marston (one of the authors of the study referenced by Dr. Morin) and I made presentations at the 39th Annual Financial Forum of the Society of Utility and Regulatory Financial Analysts in April of this year in Washington, DC. Dr. Morin made his presentation on the first day of the conference, and Professor Marston and I were on a panel during the second day of the conference, where the topic of the discussion was the market risk premium.

In her presentation, professor Marston discussed the mechanics of her ex-ante market risk premium studies (she did a study in 2001 and well as 2003). She noted that the 2003 study (cited by Dr. Morin) finds a 7.1% market risk premium and a 4.15% risk premium for utilities. She also notes that the 7.1% must be considered an upper bound due to the data anomalies contained in the study and concluded that a reasonable estimate of the

current market risk premium is 5% to 6%. The final slide in Professor Marston's power-point presentation from the April 2007 financial conference is shown below:

In sum, Professor Marston's current opinions do not support Dr. Morin's risk premium or cost of equity estimates.

Q. WHAT ARE YOUR COMMENTS ON DR. MORIN'S USE OF THE EMPIRICAL CAPM—THE ECAPM?

A. As Dr. Morin notes at page 36 of HECO T-18, the "empirical" CAPM (ECAPM) is designed to account for the fact that the security market line is believed to have a lower slope than postulated theoretically. A lower slope for the capital market line implies that the CAPM understates equity costs for low beta stocks like utilities and over-estimates the equity cost rate for high beta stocks like "dot-com" companies. The flaw in Dr. Morin's "empirical" CAPM analysis and the reason (in addition to the other reasons outlined above for the standard CAPM) his ECAPM equity cost estimate overstates the actual cost of

capital is that he uses "adjusted" betas in his ECAPM analysis while the research on which the "low slope" theory is predicated uses betas that are not adjusted.

Beta estimates published by Value Line are adjusted for the theoretical tendency for beta coefficient to migrate toward the market average of 1.0. "Adjusted" betas are higher for low-beta stocks like utilities and lower for high-beta stocks like "dot-com" companies. In other words, when low betas are adjusted upward and high betas are adjusted downward, it has the same effect as lowering the slope of the capital market line. Using "adjusted" betas along with an ECAPM analysis double-counts the effect of changing the slope of the capital market line. Virtually all of the theoretical research Dr. Morin cites regarding the support for the ECAPM (except his own) is based on studies using "raw" or "unadjusted" betas.

Q. DOESN'T DR. MORIN INDICATE THAT THE ECAPM "SLOPE" ADJUSTMENT IS DIFFERENT FROM THE VALUE LINE BETA ADJUSTMENT, AND DO NOT CONFLICT?

A. That is his position. It is correct that the ECAPM "slope" adjustment and the Value Line beta adjustment originate from different theoretical concepts; however, they have the same effect. Raising low betas and lowering high betas (the result of Value Line's "adjustment"), works to lower the slope of the capital market line, which is the goal of the ECAPM. Therefore, Dr. Morin's position that using adjusted betas in an ECAPM calculation does not double-count the slope-lowering effect is incorrect. Using adjusted betas in an ECAPM calculation results in an overstated cost of equity estimate.

Q. WHAT RESULT WOULD DR. MORIN'S ECAPM PRODUCE IF UNADJUSTED, OR "RAW" BETAS WERE USED?

A. Except for the anomalies cited in the discussion above regarding the market risk premium (which are substantial), Dr. Morin's ECAPM analysis would not be problematic on theoretical grounds if he used "raw" betas rather than "adjusted" betas. Value Line has a standard formula for adjusting "raw" betas to the adjusted betas that are published by that

investor service. It is possible, therefore, to calculate the "raw" beta from the reported Value Line beta.

For a reported weighted-average Value Line beta coefficient of 0.86 for the utility groups studied by Dr. Morin, the average "raw" beta would have been 0.79.[36] Using that "raw" beta in Dr. Morin's ECAPM formula shown on page 35 of his Direct Testimony, a current long-term T-bond risk-free rate (4.9%) and Professor Marston's mid-point market risk premium (5.5%), the equity cost estimate would be 9.53% [k = 4.9% + 0.25(5.5%) + 0.75(0.79)(5.5%) = 9.53%]. Again, that estimate should be considered to be a high estimate of the current cost of common equity capital, because utility betas are currently very high relative to the market.

B. RISK PREMIUM

Q. PLEASE DESCRIBE THE RISK PREMIUM ANALYSES UNDERTAKEN BY DR. MORIN IN HIS DIRECT TESTIMONY IN THIS PROCEEDING.

A. Dr. Morin has performed two separate risk premium analyses based on historical data. The risk premium analyses Dr. Morin utilizes include an examination of the historical return difference between earned returns of electric companies and the yield on long-term treasury bonds. He performs this analysis over a period from 1931 to 2001. In the final risk premium analysis, Dr. Morin compares the allowed returns for electric utilities with then-current T-Bond yields from 1997 through 2006.

Q. PRIOR TO DISCUSSING THE DETAILS OF EACH OF THOSE RISK PREMIUM ANALYSES, DO YOU HAVE ANY COMMENTS OF A GENERAL NATURE REGARDING RISK PREMIUM-TYPE ANALYSES?

A. Yes. A fundamental precept on which the risk premium methodology is based holds that the higher risk of stocks over bonds requires an incrementally higher return for those stocks in

[36] Beta (raw) = (Beta (adjusted) - 0.33) / 0.67

order for investors to be compensated for assuming the higher risk. Although that is generally true, it is most important to realize that, given a current bond yield of about 6.2% for BBB-rated utilities, an equity return of 8%, 10%, 13% or even 50% would fulfill the requirement of providing a "premium" over debt costs. The real issue with a risk premium analysis is determining that premium with any precision. It is not a directly observable phenomenon.

There are two other fundamental tenets upon which risk premium-type analyses are grounded that indicate this equity cost estimation methodology should not be given primary consideration in setting allowed rates of return. First, since risk premium analyses look backward in time, they assume "past is prologue." In other words, the investors' expectations for the future are assumed to mirror the average results they have experienced in the past. As I have noted, current research indicates that such is not the case. Second, implicit in the use of an average historical return premium of equities over debt is the assumption that the risk premium is constant over time. Neither of these assumptions upon which the risk premium analysis rests is true.

The fact that the risk premium varies significantly from period to period is shown most clearly in HECO-1802, which contains the data on which his risk premium result is based. The common stock annual returns on which Company witness Morin relied have ranged from +77% to -37%, while bond annual returns have ranged from +33% to –10%. Moreover, the risk premiums that result from these widely varying data series also, unsurprisingly, show very wide variation. The earned return difference between electric utility stocks and Treasury Bonds shown in HECO-1802 averages 5.62%, but ranges from +72.01% to –37.48%, with a standard deviation of 19.7%. Adding two standard deviation units to the average risk premium creates a statistical confidence interval in which we can be 95% confident that the "real" risk premium exists. That calculation produces a risk premium range of –34.55% to +45.55% [5.62% ± 2 x 19.7%]. This sort of extreme volatility is evidence that the risk premium is not a reliable equity cost estimation methodology.

The practical impact of the volatility of historical risk premium data is that, with the selection of any particular period over which to average the historical data, virtually any risk premium result can be produced. In addition, the use of historical earned return data to estimate current equity capital costs has been questioned in the financial literature, by authorities on which Dr. Morin has elected to rely:

> There are both conceptual and measurement problems with using I&S [Ibbotson and Sinquefield, now Morningstar] data for purposes of estimating the cost of capital. Conceptually, there is no compelling reason to think that investors expect the same relative returns that were earned in the past. Indeed, evidence presented in the following sections indicates that relative expected returns should, and do, vary significantly over time. Empirically, the measured historic premium is sensitive both to the choice of estimation horizon and to the end points. These choices are essentially arbitrary, yet they can result in significant differences in the final outcome. ("The Risk Premium Approach to Measuring a Utility's Cost of Equity," Brigham, Shome and Vinson, Financial Management, Spring 1985, p. 34)
>
> **Other Methods**. Several other approaches have been used to estimate the cost of common equity. Two of these should be noted. First there is the risk premium method, which is based upon the premise that common equity carries a higher risk than debt. This approach is relatively straightforward: (1) determine the historic spread between the return on debt and the return on common equity, and (2) add this risk premium to the current debt yield to derive an approximation of current equity return requirements....
> Like other methods, however, there are a number of specific problems. Over what historic period of time should the spread be established? Does the spread between the return on debt and the return on equity remain constant over time and at all interest levels? Should the spread be expressed on a before- or after-tax basis to the investor? What debt instruments should be used (e.g., government securities versus corporate or utility bonds)? What equity securities should be used? How should the resulting return requirement be adjusted for the risk that corresponds to a given utility? In light of these problems, many use the risk premium approach as a subsidiary method to test the results of other approaches." (Phillips, C. F., The Regulation of Public Utilities, Public Utilities Reports, Arlington, VA, 1993, p. 399)

The type of data described in the quote above as both conceptually and empirically

problematic form the basis of Dr. Morin's Risk Premium methodology.

Q. WHAT ARE YOUR COMMENTS REGARDING DR. MORIN'S HISTORICAL RISK PREMIUM ANALYSIS?

A. This form of the risk premium analysis measures the earned return on common stocks and subtracts from that the yield on long-term Treasury bonds to produce a risk premium. There have been fundamental changes in the nature of the relationship between stock returns and bond returns over the past sixty or seventy years. The data in HECO-1802 indicate that from about 1930 through 1960 stock returns were quite volatile showing very wide swings while bond returns were less volatile. However, in more recent years (since 1960), stocks have actually become less volatile while bonds have become more volatile, showing much wider swings in returns. In other words, the current relationship between the returns of bonds and stock is different than it has been in the past.

The table below, also taken from HECO-1802 data, confirms that the return difference between bonds and stocks has declined from the long-term average levels reported by Dr. Morin.

Table II.

Historical Risk Premiums

Years	Risk Premium
31-01	5.62%
71-01	4.57%
81-01	4.14%
91-01	3.77%

These data indicate that over the most recent 30 years, risk premiums between electric utility stock returns and Treasury bonds have averaged about 4.16% rather than the 5.62% that Dr. Morin reports in his testimony. If current T-bond yields are 4.9%, these more recent data indicate that an appropriate return on common equity for electric utilities would be 9.06%

(4.9% + 4.16% = 9.06%), rather than the 10.5% result produced in the Dr. Morin's analysis of the same data.

Finally, it is important to note again that Dr. Morin has considered only the arithmetic mean market risk premiums, which produces the highest result.

Q. WHAT ARE YOUR COMMENTS REGARDING DR. MORIN'S OTHER RISK PREMIUM ANALYSIS—THE "ALLOWED RETURN" RISK PREMIUM?

A. Dr. Morin's other risk premium analysis is one that compares historical allowed equity returns to annual average bond yields. That study indicates that the average risk premium between allowed returns for electric utilities and bond yields over the past 10 years is approximately 5.6%. However, Dr. Morin concludes that a negative correlation exists between current bond yields and risk premiums and, due to that relationship, imputes a larger risk premium (5.9%) to reach an equity cost estimate of 10.8%.[37]

It is important to understand at the outset that the annual cost rate differences between the allowed returns and utility bond yields are not necessarily reliable indicators of investor-required risk premiums. First, the allowed returns are simply averaged over all the available rate case decisions during a calendar year. That means that the capital market data the regulatory body considered were drawn from a time prior to the decision rendered and the allowed return might not correlate with decision-time-specific macro-economic events. In some cases, that period of time between the hearing and the decision can be substantial.

Second, the relative risk of the utility for which the equity return was determined is not a factor in Dr. Morin's analysis. According to HECO T-18, Dr. Morin's allowed return data were obtained from Regulatory Research Associates (RRA). The January 2007 edition of that publication shows a median allowed return for electric utilities in 2006 of 10.25%.[38] However, that figure includes an allowance of 11.90% for a wind-generating facility for Mid-America Energy. Clearly an allowed return for a generating facility (which has higher

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[37] It is important to note that Dr. Morin has not provided the supporting data or calculations on which this risk premium analysis is based (see DOD-IR-57).

[38] Regulatory Research Associates, "Regulatory Focus , Major Rate Case Decisions—January 2005-December 2006, Supplemental Study."

investment risk than a fully-integrated electric company) is not a metric that should be used to determine the cost of capital in this proceeding. Yet, that sort of anomalous data is included in Dr. Morin's allowed return risk premium.

Third, while the inclusion of an outlier may not be problematic in years in which there are many rate case decisions, that would not be the case in years in which the number of decisions is small. Moreover, the RRA rate case decision data show that during the period studied by Dr. Morin regulatory decisions were at a low ebb (e.g., 7 decisions in 2004). RRA also notes that changes in the regulatory structure in some states are "complicating historical data comparability."[39]

Fourth, Dr. Morin emphasizes the need, in a risk premium analysis, to use as long a data series as possible: "a risk premium study should consider the longest possible period for which data are available." However, Dr. Morin's allowed return Risk Premium considers only 10 years of data.

Q. YOU NOTED THAT DR. MORIN PLACES EMPHASIS ON A NEGATIVE CORRELATION BETWEEN INTEREST RATES AND RISK PREMIUMS IN REACHING HIS EQUITY COST ESTIMATE. PLEASE COMMENT ON THAT ISSUE.

A. Dr. Morin subtracts average bond yields for utilities from the equity returns allowed for utility companies over the past 10 years. Then, through a regression analysis, he describes a relationship between bond yields and risk premiums and uses that relationship, with the current cost of debt, to estimate the Company's cost of equity.

Dr. Morin's regression analysis shows a relatively strong correlation between risk premium and bond yields ($r^2 = 0.58$), which is not surprising because the resultant risk premium is a direct arithmetic function of the prevailing bond yield. A high correlation coefficient is not meaningful if the dependent and independent variables are said to be "auto-correlated."

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[39] Regulatory Research Associates, Regulatory Focus, January 30, 2007, p. 1.

If regression variables are auto-correlated, the differences between the actual values and the regression equation (the residuals) have a lagged correlation with their own past values (i.e., they are not independent of each other). Therefore, the regression equation will not necessarily serve as an accurate predictor of the relationship between the variables because the residual error will continue to increase over time. This can be especially problematic in time-series studies of the type included in Dr. Morin's risk premium analysis.

Dr. Morin does not offer the Commission any information regarding whether his data are auto-correlated. However, in the absence of any showing otherwise, it is reasonable to conclude that data series is auto-correlated based on the inclusion of the risk premium as a variable. The risk premium is an arithmetic function of the bond yield, which is the other parameter in the regression.[40] Therefore, Dr. Morin's risk premium regression analysis may not be a reliable indicator of the cost of equity capital and should be given little weight by this Commission.

Q. ARE THERE OTHER STUDIES THAT EXAMINE THE RELATIONSHIP BETWEEN RISK PREMIUMS AND INTEREST RATE LEVELS?

A. Yes. Members of the Virginia Corporation Commission Staff published a study of that relationship in 1995.[41] That study shows that within certain shorter-term sub-periods an inverse relationship appears to exist, but over the entire 1980 through 1993 study period—as interest rates declined from the very high levels of the early 1980s—absolute risk premium levels fell. Moreover, this study was based on electric utility market return data and estimated rather than allowed equity cost rates.

The arithmetic average risk premium between electric utility cost of equity and long-term Treasury bond yields averaged 3.21% over the 1980-1993 study period and the

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[40] One study of the correlation between risk premiums and bond yields recognizes that there is "severe positive autocorrelation" in the historical risk premium/bond yield data. (Harris, R., Marston, F., "The Market Risk Premium: Expectational Estimates Using Analyst's Forecasts," *Journal of Applied Finance*, 2001, pp. 6-16, footnote 7).

[41] Maddox, F., Pippert, D., and Sullivan, R., "An Empirical Study of Ex Ante Risk Premiums for the Electric Utility Industry," Financial Management, Vol. 24, No. 3, Autumn 1995, pp. 89-95.

average T-bond yield was 9.77%. Given that the most recent six-week average T-Bond yield is 4.9%, the difference between the current T-Bond yield and the average during the study period (9.77%), is 4.87%. Multiplying that yield difference by the relationship found in the Virginia Commission Staff study produces a current risk premium of 5.01% (4.87% x 0.37 = 1.80% + 3.21% = 5.01%). That "adjusted" risk premium, added to the current T-Bond rate (4.9%) produces a cost of equity capital indication of 9.91% (4.9% + 5.01%).

Therefore, if one elects to believe such data are reliable (which I do not), there are studies of the relationship between interest rates and risk premiums, which: 1) show a declining trend in risk premiums over the 1980s and early 1990s, 2) are based on the cost of equity of electric utilities, not unregulated firms and 3) produce equity cost estimates which are substantially below those presented by Dr. Morin and tend to corroborate the equity cost estimates I provide in this testimony.

Q. IS THERE OTHER, MORE RECENT EVIDENCE THAT COUNTERS THE ASSUMPTION THAT EXPECTED RISK PREMIUMS VARY INVERSELY WITH INTEREST RATES?

A. Yes. In Section I of my testimony, I mentioned an on-going survey by professors at Duke University. Drs. John Graham and Campbell Harvey, in conjunction with *CFO Magazine* have, since 1999, polled corporate financial officers regarding the expected market risk premium. It was found risk premiums to range from 2.5% to 4.5% (well below the historical risk premiums used by Dr. Morin), and the expected risk premium varies directly with interest rates. That is, as interest rates decline, so do expected risk premiums. Therefore, recently published evidence in the financial literature directly counters Dr. Morin's historical analysis that indicates risk premiums increase when interest rates decline.

Finally, the notion of risk premiums varying inversely with interest rates is counter-intuitive. Let's assume that investors require a 4% premium to invest in utility stocks in today's capital market environment, with T-Bonds at 5%. Now, suppose some dramatic international event occurred that caused economic turmoil and sent US Treasury bond yields to their 1981 levels of almost 20%. In that extremely unstable economic

environment—in which investors have to be induced to invest in risk-free securities by means of a 20% return—it is simply not logical to believe that the risk premium they require for common stocks in that environment would *decline*, as Dr. Morin's thesis indicates. With the added uncertainty and higher interest rates, it is reasonable to believe that investors would require increased risk premiums. That logic is confirmed in the Graham and Harvey studies cited above.

C. DISCOUNTED CASH FLOW

Q. HAVE YOU REVIEWED THE DETAILS OF DR. MORIN'S DCF ANALYSES?

A. Yes, I have.

Q. WHAT ARE YOUR COMMENTS REGARDING DR. MORIN'S DCF ANALYSIS?

A. Dr. Morin's standard DCF analysis relies on dividend yields published in Value Line. I have no concerns with the use of that source of information. Dr. Morin increases the current dividend by one plus the DCF growth rate, regardless of whether or not a company is expected to increase its dividend in the coming year. Also, as Value Line explains to its subscribers in "A Subscribers' Guide," the dividend yield published by Value Line in its *Ratings & Reports*, is based on the "cash dividends *estimated to be declared in the next 12 months* divided by the recent [stock] price." Therefore, in adjusting the dividend yield published by Value Line for one year's expected growth, Dr. Morin is double counting that growth. His dividend yields are overstated for that reason.

The growth rate portion of Dr. Morin's DCF analysis is also problematic. First, Dr. Morin's growth rate analysis is mechanistic in that it simply plugs selected projected data into a formula to produce a growth rate with no underlying analysis of either the historical or projected growth rate fundamentals. Dr. Morin, in his own published work, warns against this type of analysis.[42]

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[42] Morin, R., Regulatory Finance, Utilities' Cost of Capital, Public Utilities Reports, Arlington, VA, 1994, p. 244.

Second, Dr. Morin's growth rate analysis relies exclusively on earnings growth rate projections. As I discussed in detail in DOD-202 attached to this testimony, exclusive reliance on earnings growth, absent any examination of the underlying fundamentals of long-run growth, can lead to inaccurate equity cost estimates. For example, reliance on projected earnings growth in a situation in which projected earnings were expected to recover from reduced levels would include (in any DCF estimate) the assumption that equity returns will increase at the same exaggerated rate every five years into the indefinite future. Of course, this would not be a reasonable expectation, and any DCF analysis based on a mechanistic analysis that automatically includes such data would not produce a reasonable result. Therefore, while I have no problem with the consideration of earnings growth rate projections in determining DCF growth, they should not be afforded the exclusive weighting allowed by Dr. Morin, especially absent consideration of the underlying factors.

Third, Brealey & Meyer's latest textbook, which is a source on which Dr. Morin relies for authority, notes that analysts' earnings growth estimates have been shown to be overly-optimistic (i.e., too high), in comparison to actual results. Therefore, any DCF result obtained using those growth rates should be considered an upper bound of the cost of equity:

> Estimates of this kind [DCF] are only as good as the long-term forecasts on which they are based. For example, several studies have observed that security analysts are subject to behavioral biases and their forecasts tend to be over-optimistic [footnote]. If so, such DCF estimates of the cost of equity should be regarded as upper estimates of the true figure.
> [footnote] See, for example, A. Dugar and S. Nathan, "The Effect of Investment Banking Relationships on Financial Analysts' Earnings Investment Recommendations," *Contemporary Accounting Research* 12 (1995), pp. 131-160. (Brealey, Meyers, Allen, Principles of Corporate Finance, 8th Ed., McGraw-Hill Irwin, Boston MA, 2006, p. 67)

Fourth, as I noted above, Dr. Morin uses both Zack's and Value Line earnings projections in determining his standard DCF growth rate. Earnings growth projections are the only growth rate that Zack's publishes, and its use is reasonable, although there are

other providers of analysts' projected earnings growth. However, in addition to its earnings projections, Value Line also publishes 3- to 5-year dividend and book value growth rate projections for each company it follows. In his HECO-1803 showing why historical growth is not appropriate for the companies in his sample group, Dr. Morin references all three types of growth published by Value Line. Investors have equal access to all three growth rates (earnings, dividends and book value) and it would be reasonable to assume they utilize all three when making a determination of long-term sustainable growth. Moreover, in theory, the DCF assumes that earnings, dividends and book value all grow at the same rate. Therefore, the use of the average of those three projected growth rate parameters published in Value Line would provide a more balanced growth rate analysis in Dr. Morin's mechanistic standard DCF model.

HECO-1804 contains Dr. Morin's DCF analysis of his electric sample group, based only on Value Line's earnings projections. Table III below replicates Dr. Morin's analysis using the most recent projected earnings, dividends and book value as well as the year-ahead dividend yield published in the June 1, 2007 edition of Value Line *Summary & Index*:

Table III.

Morin's Sample Group – Value Line DCF

Company	Value Line Projected Growth			Dividend
	Earnings	Dividends	Book Value	Yield
Alliant Energy	5.00%	5.50%	4.00%	2.80%
Ameren Corp.	1.00%	0.00%	3.00%	4.70%
CH Energy Group	3.00%	1.00%	2.00%	4.40%
Consol. Edison	3.50%	1.00%	4.00%	4.60%
DTE Energy	4.00%	2.50%	3.00%	4.00%
Energy East Corp.	2.50%	1.00%	3.00%	5.00%
Entergy Corp.	2.50%	4.50%	2.50%	1.90%
Exelon Corp.	9.50%	6.00%	11.00%	2.30%
MGE Energy	6.00%	0.50%	7.00%	3.90%
Northeast Utilities	12.00%	6.50%	3.50%	2.50%
NSTAR	8.50%	7.00%	5.50%	3.70%
Pepco Holdings	8.00%	3.00%	3.00%	3.40%
PNM Resources	4.50%	8.00%	5.50%	3.10%
PPL Corp.	11.00%	13.00%	8.00%	2.80%
Puget Energy Inc.	6.00%	3.00%	4.00%	3.90%
TECO Energy	4.50%	3.00%	5.50%	4.40%
UniSource Energy	6.50%	8.00%	5.50%	2.40%
Wisconsin Energy	6.50%	6.50%	6.50%	2.10%
Xcel Energy Inc.	5.50%	5.00%	4.00%	3.90%
Average	5.66%	4.87%	4.53%	
Overall Average		**5.01%**		**3.46%**
DCF Cost of Equity			**8.47%**	

These data show that the average of Value Line's projected earnings, dividends and book value (all of which are available to investors) is 5.01%, 65 basis points below the 5.66% earnings-only Value Line growth rate selected by Dr. Morin. The above table also shows Value Line's recently published dividend yield for Dr. Morin's companies (3.46%), which is below the 3.8% he derives in HECO-1804. Moreover, simply by using all the projected growth rate data available in Value Line instead of just part of it, the DCF equity cost estimate for the combination electric utilities is about 8.5%. This equity cost estimate, is roughly 120 basis points below the 9.7% DCF result Dr. Morin provides in HECO-1804.

Q. DO YOU HAVE ANY SUMMARY COMMENTS REGARDING DR. MORIN'S EQUITY COST ESTIMATE IN THIS PROCEEDING, MR. HILL?

A. Dr. Morin has placed primary emphasis on the results of risk premium analyses, which are less reliable as indicators of the cost of equity capital than a DCF analysis. While Dr. Morin's DCF analyses provide equity cost results that are closer to the current cost of capital for companies like HECO, those results are overstated due to three factors. First, Dr. Morin has relied on only one growth rate measure, ignoring other data available to investors that indicate lower expected returns. Second, Dr. Morin has added unnecessarily 30 basis points to his recommendations in this case for flotation costs associated with common equity issuance that are already accounted for in the stock price investors are willing to provide. Third, Dr. Morin has increased dividend yields for one year's projected dividend growth when that growth is already included in the published yield.

Dr. Morin's historical risk premium analyses are overstated, due to the fact that historical results do not replicate investors' current expectations. His DCF results also include factors that cause them to be overstated by more than 120 basis points. A thorough examination of the evidence provided by Company witness Morin indicates that the cost of equity capital estimated by DOD in this proceeding is reasonable, and, if used to determine rates in this case, will provide the Company an opportunity to earn the return investors require while maintaining HECO's financial position and its ability to attract capital.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY, MR. HILL?

A. Yes, it does.

EDUCATION AND EMPLOYMENT HISTORY OF STEPHEN G. HILL

EDUCATION

Auburn University - Auburn, Alabama - Bachelor of Science in Chemical Engineering (1971); Honors - member Tau Beta Pi national engineering honorary society, Dean's list, candidate for outstanding engineering graduate; Organizations - Engineering Council, American Institute of Chemical Engineers

Tulane University - New Orleans, Louisiana - Masters in Business Administration (1973); concentration: Finance; awarded scholarship; Organizations - member MBA curriculum committee, Vice-President of student body, academic affairs

Continuing Education - NARUC Regulatory Studies Program at Michigan State University

EMPLOYMENT

West Virginia Air Pollution Control Commission (1975)
Position: Engineer ; Responsibility: Overseeing the compliance of all chemical companies in the State with the pollution guidelines set forth in the Clean Air Act.

West Virginia Public Service Commission-Consumer Advocate (1982)
Position: Rate of Return Analyst ; Responsibility: All rate of return research and testimony promulgated by the Consumer Advocate; also, testimony on engineering issues, when necessary.

Hill Associates (1989)
Position: Principal; Responsibility: Expert testimony regarding financial and economic issue in regulated industries.

PUBLICATIONS

"The Market Risk Premium and the Proper Interpretation of Historical Data," Proceedings of the Fourth NARUC Biennial Regulatory Information Conference, Volume I, pp. 245-255.
"Use of the Discounted Cash Flow Has Not Been Invalidated," Public Utilities Fortnightly, March 31, 1988, pp. 35-38.

MEMBERSHIPS

American Institute of Chemical Engineers; Society of Utility and Regulatory Financial Analysts (Certified Rate of Return Analyst, Member of the Board of Directors)

PRIOR EXPERIENCE

Mr, Hill, is a Certified Rate of Return Analyst, doing business as Hill Associates. He has testified in over 250 regulatory proceedings over the past twenty years on cost of capital, financial, economic, and corporate governance issues related to regulated industries. He has provided testimony in electric, gas, telephone, and water utility rate proceedings as well as in proceedings related to utility diversification, deregulation, and management financial policy. In those cases, he has testified on behalf of consumer advocates, attorneys general and utility commissions. In addition, he has testified on cost of capital issues in auto, homeowners and workers' compensation insurance rate proceedings. Mr. Hill has also been an advisor to the Arizona Corporation Commission on matters of utility finance in bankruptcy proceedings.

Mr. Hill has testified before the West Virginia Public Service Commission, the Texas Public Utilities Commission, the Oklahoma State Corporation Commission, the Public Utilities Commission of the State of California, the Maryland Public Service Commission, the Pennsylvania Public Utilities Commission, the State of Maine Public Utilities Commission, the Ohio Public Utilities Commission, the Missouri Public Service Commission, the City Council of Austin, Texas, the South Carolina Public Service Commission, the Public Utilities Commission of the State of Hawaii, the New Mexico Corporation Commission, the Minnesota Public Utilities Commission, the State of Washington Utilities and Transportation Commission, the State of Rhode Island Public Utilities Commission, the New Hampshire Public Service Commission, the Public Service Commission of Utah, the Illinois Commerce Commission, the Kansas Corporation Commission, the Vermont Public Service Board, the Indiana Utility Regulatory Commission, the Virginia Corporation Commission, the Montana Public Service Commission, the Arizona Corporation Commission, the Public Service Commission of the State of Wisconsin, the Insurance Commissioner of the State of Texas, the North Carolina Insurance Commissioner, the Georgia Public Service Commission, the Connecticut Department of Public Utility Control, the Public Service Commission of Louisiana, the Hawaii Public Utilities Commission, the Federal Communications Commission and the Federal Energy Regulatory Commission.

Q. PLEASE PROVIDE AN EXAMPLE THAT DESCRIBES THE DETERMINANTS OF LONG-TERM SUSTAINABLE GROWTH.

A. Assume that a hypothetical regulated firm had a first period common equity or book value per share of $10, the investor-expected return on that equity was 10% and the stated company policy was to pay out 60% of earnings in dividends. The first period earnings per share are expected to be $1.00 ($10/share book equity x 10% equity return) and the expected dividend is $0.60. The amount of earnings not paid out to shareholders ($0.40), the retained earnings, raises the book value of the equity to $10.40 in the second period. The table below continues the hypothetical for a five year period and illustrates the underlying determinants of growth.

TABLE A.

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	GROWTH
BOOK VALUE	$10.00	$10.40	$10.82	$11.25	$11.70	4.00%
EQUITY RETURN	10%	10%	10%	10%	10%	-
EARNINGS/SH.	$1.00	$1.040	$1.082	$1.125	$1.170	4.00%
PAYOUT RATIO	0.60	0.60	0.60	0.60	0.60	-
DIVIDENDS/SH.	$0.60	$0.624	$0.649	$0.675	$0.702	4.00%

We see that under steady-state conditions, the earnings, dividends and book value all grow at the same rate. Moreover, the key to this growth is the amount of earnings retained or reinvested in the firm and the return on that new portion of equity. If we let "b" equal the retention ratio of the firm (1 – the payout ratio) and let "r" equal the firm's expected return on equity, the DCF growth rate "g" (also referred to as the internal or sustainable growth rate) is equal to their product, or

$$g = br. \qquad (i)$$

Professor Myron Gordon, who developed the Discounted Cash Flow technique and first introduced it into the regulatory arena, has determined that Equation (i) embodies the

underlying fundamentals of growth and, therefore, is a primary measure of growth to be used in the DCF model. Professor Gordon's research also indicates that analysts' growth rate projections are useful in estimating investors' expected sustainable growth.

I should note here that the above hypothetical does not allow for the existence of external sources of equity financing, i.e., sales of common stock. Stock financing will cause investors to expect additional growth if the company is expected to issue new shares at a market price that exceeds book value. The excess of market over book would inure to current shareholders, increasing their per share equity value. Therefore, if the company is expected to continue to issue stock at a price that exceeds book value, the shareholders would continue to expect their book value to increase and would add that growth expectation to that stemming from earnings retention or internal growth. Conversely, if a company were expected to issue new equity at a price below book value, that would have a negative effect on shareholder's current growth rate expectations. In such a situation, shareholders would perceive an overall growth rate less than that produced by internal sources (retained earnings). Finally, with little or no expected equity financing or a market-to-book ratio near unity, investors would expect the sustainable growth rate for the company to equal that derived from Equation (i), "g = br." Dr. Gordon[1] identifies the growth rate which includes both expected internal and external financing as:

$$g = br + vs, \qquad \text{(ii)}$$

where,

g = DCF expected growth rate,
r = return on equity,
b = retention ratio,
v = fraction of new common stock sold that accrues to the current shareholder,
s = funds raised from the sale of stock

[1]Gordon, M.J., The Cost of Capital to a Public Utility, MSU Public Utilities Studies, East Lansing, Michigan, 1974, pp., 30–33.

as a fraction of existing equity.

Additionally,

$$v = 1 - BV/MP, \qquad \text{(iii)}$$

where,

MP = market price,
BV = book value.

I have used Equation (iii) as the basis for my examination of the investor expected long-term growth rate (g) in this proceeding.

Q. IN YOUR PREVIOUS EXAMPLE, EARNINGS AND DIVIDENDS GREW AT THE SAME RATE (BR) AS DID BOOK VALUE. WOULD THE GROWTH RATE IN EARNINGS OR DIVIDENDS, ALONE, BE SUITABLE FOR DETERMINING THE DCF GROWTH RATE?

A. No. Rates of growth derived from earnings or dividends alone can be unreliable due to extraneous influences on those parameters such as changes in the expected rate of return on common equity or changes in the payout ratio. That is why it is necessary to examine the underlying determinants of growth through the use of a sustainable growth rate analysis.

If we take the hypothetical example previously stated and assume that, in year three, the expected return on equity rises to 15%, the resultant growth rate for earnings and dividends far exceeds that which the company could sustain indefinitely. The potential error in using those growth rates to estimate "g" is illustrated in the following table.

TABLE B.

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	GROWTH
BOOK VALUE	$10.00	$10.40	$10.82	$11.47	$12.157	5.00%
EQUITY RETURN	10%	10%	15%	15%	15%	10.67%
EARNINGS/SH.	$1.00	$1.040	$1.623	$1.720	$1.824	16.20%
PAYOUT RATIO	0.60	0.60	0.60	0.60	0.60	-
DIVIDENDS/SH.	$0.60	$0.624	$0.974	$1.032	$1.094	16.20%

What has happened is a shift in steady-state growth paths. For years one and two, the sustainable rate of growth (g=br) is 4.00%, just as in the previous hypothetical. Then, in the last three years, the sustainable growth rate increases to 6.00% (g=br = 0.4x15%). If the regulated firm were expected to continue to earn a 15% return on equity and retain 40% of its earnings, then a growth rate of 6.0% would be a reasonable estimate of the long-term sustainable growth rate. However, the compound annual growth rate for dividends and earnings exceeds 16% which is the result only of an increased equity return rather than the intrinsic ability of the firm to grow continuously at a 16% annual rate. Clearly, this type of estimate of future growth cannot be used with any reliability at all. In the case of the hypothetical, to utilize a 16% growth rate in a DCF model would be to expect the company's return on common equity to increase by 50% every five years into the indefinite future. This would be a ridiculous forecast for any regulated firm and underscores the importance of utilizing the underlying fundamentals of growth in the DCF model.

It can also be demonstrated that a change in our hypothetical regulated firm's payout ratio makes the past rate of growth in dividends an unreliable basis for predicting "g". If we assume our regulated firm consistently earns its expected equity return (10%) but in the third year, changes its payout ratio from 60% to 80% of earnings, the results are shown in the table below.

TABLE C.

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	GROWTH
BOOK VALUE	$10.00	$10.40	$10.82	$11.036	$11.26	3.01%
EQUITY RETURN	10%	10%	10%	10%	10%	-
EARNINGS/SH.	$1.00	$1.040	$1.082	$1.104	$1.126	3.01%
PAYOUT RATIO	0.60	0.60	0.80	0.80	0.80	7.46%
DIVIDENDS/SH.	$0.60	$0.624	$0.866	$0.833	$0.900	10.67%

What we see here is that, although the company has registered a high dividend growth rate (10.67%), it is, again, not at all representative of the growth that could be sustained indefinitely, as called for in the DCF model. In actuality, the sustainable growth rate has declined from 4.0% the first two years to only 2.0% (g=br = 0.2x10%) during the last three years due to the increased payout ratio. To utilize a 10% growth rate in a DCF analysis of this hypothetical regulated firm would 1) assume the payout ratio of the firm would continue to increase 33% every five years into the indefinite future, 2) lead to the highly implausible result that the firm intends to consistently pay out more in dividends than it earns and 3) grossly overstate the cost of equity capital.

SAMPLE COMPANY GROWTH RATE ANALYSES

ELECTRIC UTILITIES

FE – FirstEnergy Corp. - FE's sustainable growth rate averaged 3.74% over the five-year historical period, with substantially higher results in the most recent year (2006). Value Line projects that the internal growth will increase through 2010-12, will bring sustainable growth to 7% by that time. FE's book value, which increased at a 4.5% rate during the most recent five years, is expected to continue at a higher 5.5% rate in the future. FE's earnings per share are projected to increase at 9% (Value Line) to 7% (Reuters), and 6% (Zack's) rates, indicating variability in that growth rate measure. Value Line's projections are largely a function of it's three-year averaging technique, which includes FE's 2003 results in which it paid out more in dividends that it took in earnings, thereby depressing the base year average and causing the projected earnings to overstate long-term expectations. Also, in the projected period, FE's return on equity is expected to increase 15% over recent historical averages, also adding to earnings growth. FE's dividends are expected to grow at a 5.5% rate, more similar to other investor services' earnings growth expectations. Historically FE's earnings grew at a 3.5% rate, according to Value Line, and its dividends showed 4% growth over the past five years. The projected sustainable growth, earnings and book value growth rate data indicate that investors can expect the growth from FE in the future to be higher than that which has existed in the past. Investors can reasonably expect a sustainable growth rate of **6.5%** for FE.

Regarding share growth, FE's shares outstanding showed a 1.76% increase over the past five years. However, FE's growth rate in shares outstanding is expected to fall to about a –0.9% rate of increase through 2010-12, as Value Line indicates a stock buy-back may be in the offing for this company. Those projections indicate that future share growth will be below past averages. An expectation of share growth of **0%** for this company is reasonable.

NU – Northeast Utilities – NU's sustainable growth rate has averaged 2.01% over the most recent five-year period, with a declining trend. Value Line expects NU's sustainable growth to increase to approximately 3.6% by the 2010-2012 period. NU's book value growth rate is expected to be 3.5% over the next five years, up from the 3% rate of growth experienced over the past five years, and similar to sustainable growth projections. Also, NU's earnings per share are projected to increase at 12% according to Value Line, 9.4% (Reuters), and 13% (Zack's), as the company sheds its money-loosing unregulated operations. Historically, NU's earnings showed no growth, according to Value Line. On a five-year compound return basis, NU's earnings had 5% earnings growth, historically. Value Line also projects a 6.5% growth in dividends, following the restoration of this company's dividend in 1999. Value Line's historical dividend growth for NU (16.5%) is distorted due to the inclusion of a zero dividend in 1998 (one year of the base-year period). The average projected dividend, earnings and book value growth for NU is 7%. Largely due to Value Line's dividend growth projection and because the high earnings growth projections are unlikely to be sustainable for the long term, investors can reasonably expect a sustainable growth rate in the future of **6.0%** for NU.

Regarding share growth, NU's shares outstanding grew at approximately a 4.9% rate over the past five years, due to an equity issuance last year. The number of

shares is expected to grow at a 1.26% rate through 2010-12. An expectation of share growth of **2.0%** for this company is reasonable.

PGN- Progress Energy- PGN's sustainable growth rate has averaged 2.40% over the most recent five-year period. Value Line expects PGN's sustainable growth to decline to a growth rate level of 1.9% by the 2010-2012 period. PGN's book value growth rate is also expected to decline to 1.5% over the next five years, well below the 5% rate of growth experienced over the past five years, pointing to lower growth. Also, PGN's earnings per share are projected to increase at 3% (Value Line) to 4.57% (Reuters), to 4.4% (Zack's) rate—all above the indicated projected internal growth rate. Also, PGN's dividends are expected to grow at a 1%, below historical dividend growth of 2.5%. Over the past five years PGN earnings grew at a –0.5% rate, according to Value Line's three-year base calculation methodology. Investors can reasonably expect a sustainable growth rate in the future of **3.0%** for PGN.

Regarding share growth, PGN's shares outstanding increased at approximately a 2.4% rate over the past five years. The number of shares outstanding in 2010-2012 is expected to show about a 1.22% increase from 2006 levels. An expectation of share growth of **1.75%** for this company is reasonable.

SO – Southern Company - SO's sustainable growth rate has averaged 4.24% over the most recent five year period (2002-2006). Value Line expects SO's sustainable growth to decline below that historical growth rate level, reaching 3.4% by the 2010-2012 period. SO's book value growth rate is expected to be 5% over the next five years. Book value increased at a only a 1% rate of growth over the past five years (the company shed its unregulated generation subsidiary a couple of years ago). SO's earnings per share are projected to increase at 3.0% (Value Line), 4.57% (Reuters) and 4% (Zack's). Value Line projects that SO will increase dividends at a 4% rate in the future. Over the past five years, SO's earnings growth was 3% and its dividends increased at only a 2% rate. Investors can reasonably expect long-term sustainable growth rate in the future to be similar to that of the past; a growth rate of **4.0%** is reasonable for SO.

Regarding share growth, SO's shares outstanding increased at about a 1% rate over the past five years. The growth the number of shares is projected by Value Line to increase at a 1.5% rate through the 2010-12 period. An expectation of share growth of **1.25%** for this company is reasonable.

LNT – Alliant Energy - LNT's sustainable growth rate has averaged 2.60% over the most recent five-year period, with an increasing trend and sub-par results in 2002. VL expects LNT's sustainable growth to be almost 4.4% by the 2010-2012 period. LNT's book value growth rate is expected to be 4% over the next five years, above the –2.5% rate of growth experienced over the past five years. This company also shed assets in the recent past. Also, LNT's earnings per share are projected to increase at 5% (VL), 5.67% (Reuters) and 6.0% (Zack's). Dividends are expected to grow at 5.5%. Over the past five years, LNT's earnings growth was -3% while its dividends decreased at a 12% rate, due to a dividend reduction in 2003. Investors can reasonably expect a sustainable growth rate in the future of **5.0%** for LNT.

Regarding share growth, LNT's shares outstanding increased at approximately a 6% rate over the past five years. The number of shares outstanding in 2010-2012 is expected to increase at a –0.5% rate. An expectation of share growth of **2%** for this company is reasonable.

AEE – Ameren Corp. - AEE's sustainable growth rate has averaged 1.16% over the most recent five year period (2002-2006), with a declining trend. Value Line expects AEE's sustainable growth to improve over recent low growth rate levels and reach almost 2% by the 2010-2012 period. AEE's book value growth rate also shows a decline in the future, and is expected to be 3% over the next five years—below the 5% rate of growth experienced over the past five years, but above internal growth projections. Also, AEE's earnings per share are projected to increase at a 1% (Value Line) rate. However, Reuters and Zacks project 7.5% and 6.7% earnings growth for AEE, respectively. AEE's dividends are expected to show no growth over the next five years, after growing at a 0% rate the previous five years, according to Value Line. Over the past five years, AEE's earnings growth was 0.5%. Based on projected earnings and book value growth, investors can reasonably expect long-term sustainable growth rate in the future to be higher than the internal growth projections published by Value Line; a growth rate of **4.0%** is reasonable for AEE.

Regarding share growth, AEE's shares outstanding increased at a 7.6% rate over the past five years due to a series of equity issuances. The growth the number of shares is projected by Value Line to slow to an increase of about a 1% rate between 2006 and the 2010-12 period. An expectation of share growth of **2.5%** for this company is reasonable.

AEP – American Electric Power - AEP's sustainable growth rate averaged 4.62% over the most recent five-year period, with an increasing trend. VL projects, by the 2010-12 period, sustainable growth will approximate 5.6%. AEP's projected book value also indicates increased growth -- book value grew at a –2.5% rate during the most recent five years and is expected to rise at a 5.5% rate in the future, according to Value Line. Value Line projects a rate of earnings increase for AEP of 7%, while Reuters projects 5% and Zack's projects 4.7%--below sustainable growth projections. Dividends are expected to grow at a 7.5% rate, increasing long-term growth expectations. Historically AEP's earnings grew at a 3.0% rate, and dividends increased at a –9.5% rate due to a dividend reduction in 2003. Therefore investors can reasonably expect a long-term sustainable growth rate of **5.5%.**

Regarding share growth, AEP's shares outstanding grew at a 4% rate over the past five years. The five-year average level of share growth is expected to decrease at approximately 0.4% annually through 2010-12. An expectation of share growth of **1.5%** for this company is reasonable.

CNL – Cleco Corp. - CNL's sustainable growth rate averaged 3.9% for the five-year period, with the results in the most recent years below that average. Value Line expects sustainable growth to continue at about a 3% level through the 2010-12 period. CNL's book value growth is expected to increase at an 6.5% rate, well above the historical level of 4%, due to the building of a new power plant. CNL's earnings per share is projected to show 4% growth over the next five years, and its dividends are expected to show 4% growth, according to Value Line (Reuters & Zacks project 12% earnings growth). Historically CNL's earnings increased at a 1% rate and its dividends increased at a 2% rate of growth, according to Value Line. These data indicate that future growth will be above prior growth rate averages. Investors can reasonably expect sustainable growth from CNL to be below past averages, a sustainable internal growth rate of **5.0%** is a reasonable expectation for this company.

Regarding share growth, CNL's shares outstanding grew at approximately a 5.4% rate over the past five years. The growth in the number of shares is expected

by Value Line to be 1.67% through 2010-12. An expectation of share growth of **3.0%** for this company is reasonable.

DPL – DPL, Inc.- DPL's sustainable growth rate has averaged 3.5% over the most recent five-year period, with an increasing trend. Value Line expects DPL's sustainable growth to increase to approximately 6.8% by the 2010-2012 period. DPL's book value growth rate is expected to be 5% over the next five years, up substantially from the -1% rate of growth experienced over the past five years, but below sustainable growth projections. Also, DPL's earnings per share are projected to increase at a rate of from 8% (Value Line), to 9% (Reuters) to 8.7% (Zack's). The genesis of that large earnings growth is an approximately 20% increase in earned return over the next five years—a rate of increase that is unlikely to be sustained. Over the past five years, DPL's earnings growth was -1% according to Value Line. Historically, dividends grew at only a 0.5% rate, and Value Line expects that rate to increase to 7.5% over the next five years. Investors can reasonably expect a higher sustainable growth over the long term — **6.5%** for DPL is reasonable.

Regarding share growth, DPL's shares outstanding increased at a -3% rate over the past five years. The number of shares is expected to increase at a 0.7% rate through 2010-12. An expectation of share growth of **0%** for this company is reasonable.

EDE – Empire District Electric - EDE's sustainable internal growth rate averaged –1% over the five-year historical period, with several negative growth years. Value Line projects EDE's sustainable growth to rise to a level of almost 4% through 2010-12—a substantial improvement over historical results. EDE's book value growth rate is expected to continue in the future at 3.0%, somewhat higher than the historical level of 2%. However, EDE's earnings per share are projected to increase at 10% to according to Value Line, while the analysts' surveyed by Reuters project earnings growth at 3%, a relatively wide differential. EDE's dividends are expected to grow at a 1.5% rate over the next five years, and moderating long-term growth expectations. EDE's historical earnings growth was –5%, according to Value Line. Sustainable growth has been relatively inconsistent for this company, historically but is expected to trend upward in the future. Also, Value Line's earnings growth projection is skewed upward by their inclusion of the company's poor 2004 earnings in is "base" three-year period. From 2003 through the mid-point of the 2010-2012 period, Value Line's projected earnings per share indicate a 4% growth rate. Investors can reasonably expect a sustainable growth rate of **3.5%** from EDE.

Regarding share growth, EDE's shares outstanding grew at about a 7.6% rate over the past five years. The level of share growth is expected by Value Line to decline somewhat to 1.76% through 2010-12. An expectation of share growth of **3.5%** for this company is reasonable.

ETR – Entergy Corp. - ETR's internal sustainable growth rate has averaged 6.23% over the most recent five year period (2002-2006). Sustainable growth is expected to rise to about 7% by the 2010-2012 period. Also, ETR's book value growth rate is expected to be 6.5% over the next five years—an increase from the 4.5% rate of growth experienced over the past five years—pointing to higher growth expectations for the future. ETR's earnings per share are projected to increase at a rate of from 7.5% (Value Line) to 9.6% (Reuters), and 10.8% (Zacks). ETR's dividends are expected to grow at a high 7.5% rate, supporting higher sustainable growth expectations. Over the past five years, ETR's earnings grew at a 10% rate

according to Value Line (8.6% on a compound growth basis) while its dividends showed 7.5% growth. These data indicate that investors can reasonably expect a sustainable growth rate in the future above past averages, however earnings growth projections are above historical sustainable growth. Therefore, **7.5%** is a reasonable long-term growth expectation for ETR.

Regarding share growth, ETR's shares outstanding grew at a –2.3% rate over the past five years. The number of shares outstanding is projected by Value Line to continue to decrease at approximately a 1% rate through 2010-12. An expectation of share growth of **-1%** for this company is reasonable.

HE – Hawaiian Electric - HE's sustainable growth rate has averaged 1.6% over the most recent five year period (2002-2006), with lower growth in the most recent year. However, Value Line expects HE's sustainable growth to increase from that historical growth rate level to reach 3.5% by the 2010-2012 period. Also, HE's book value growth rate is expected to be 0.5% over the next five years, down from the 2% rate of growth experienced over the past five years. HE's earnings per share are projected to increase at a 4% (Value Line) to 4.9% (Zack's) to 4.8% (Reuters) rate. The company's dividends are expected to show no growth over the next five years. Over the past five years, HE's earnings grew at a -1% rate while its dividends showed no increase. Investors can reasonably expect a sustainable growth rate in the future of **3.75%** for HE.

Regarding share growth, HE's shares outstanding grew at a 2.56% rate over the past five years. The number of shares is projected by Value Line to show a 1.3% rate of increase through the 2010-12 period. An expectation of share growth of **1.75%** for this company is reasonable.

PNM Resources – PNM - PNM's sustainable growth rate has averaged 3.64% over the most recent five year period with no discernable trend. Value Line expects PNM's sustainable growth to fall below that historical average growth rate level to 3.04% by the 2010-2012 period. PNM's book value growth rate is expected to be 5.5% over the next five years, above the 4.5% rate of growth experienced over the past five years. Those data, taken together, indicate stable growth. Also, PNM's earnings per share are projected to increase at a 4.5% (Value Line) to 8.8% (Zacks) to 10.3% (Reuters) rate. Its dividends are expected to grow at 8.0%, increasing long-term growth rate expectations. Over the past five years, PNM's earnings growth was –2.5% while its dividends increased at a 7.5% rate. Investors can reasonably expect a sustainable growth rate in the future of **6.0%** for PNM.

Regarding share growth, PNM's shares outstanding increased at a 6.9% rate over the past five years. The number of shares outstanding in 2010-2012 is expected to increase at about a 0.9% rate from 2005 levels. An expectation of share growth of **2.5%** for this company is reasonable.

Pinnacle West – PNW - PNW's sustainable growth rate has averaged 2.38% over the most recent five-year period with a downward trend. Value Line expects PNW's sustainable growth to fall below that historical average growth rate level to 2.14% by the 2010-2012 period. PNW's book value growth rate is expected to be 2.5% over the next five years, below to the 4% rate of growth experienced over the past five years, indicating stable growth expectations for this firm. PNW's earnings per share are projected to increase at a 3.5% (Value Line), to 6.75% (Reuters), to 6.7% (Zack's) rate—all well above the projected internal growth rate. PNW's dividends are expected to grow at a 4% rate, supporting higher long-term growth rate expectations. Over the past five years, PNW's earnings growth was –5% while its

dividends increased at a 6% rate. Investors can reasonably expect a sustainable growth rate in the future of **4.75%** for PNW.

Regarding share growth, PNW's shares outstanding increased at approximately a 2.3% rate over the past five years. The number of shares outstanding in 2010-2012 is expected to show a 0.01% increase from 2006 levels. An expectation of share growth of **0.5%** for this company is reasonable.

UNS – Unisource Energy - UNS's sustainable growth rate has averaged 4.23% over the most recent five-year period. Value Line expects UNS's sustainable growth to decline below that historical growth rate level, to about 3.75%, by the 2010-2012 period. UNS's book value growth rate is expected to be 5.5% over the next five years, below the very high 9.5% rate of growth experienced over the past five years. UNS's earnings per share are projected to increase at a rate of 6.5% (Value Line) to 10% (Zack's & Reuters). Its dividends are expected to grow at an 8.5% rate—winding down from an historical growth rate of more than 25% (UNS's dividend was eliminated during bankruptcy proceedings and was re-instituted in 2000. Nevertheless that high dividend growth rate would tend to increase sustainable growth rate expectations. Over the past five years, UNS's earnings growth was 1.5%. Investors can reasonably expect a sustainable growth rate in the future to be similar to that of the past and **6.0%** is reasonable for UNS.

Regarding share growth, UNS's shares outstanding increased at approximately a 1.2% rate over the past five years. That rate of increase is expected to decline in the future to a 1.4% rate through 2010-2012. An expectation of share growth of **1.25%** for this company is reasonable.

CORROBORATIVE EQUITY CAPITAL COST ESTIMATION METHODS

CAPITAL ASSET PRICING MODEL

Q. PLEASE DESCRIBE THE CAPITAL ASSET PRICING MODEL (CAPM) YOU USED TO ARRIVE AT AN ESTIMATE FOR THE COST RATE OF COMMON EQUITY CAPITAL FOR THE COMPANY.

A. The CAPM states that the expected rate of return on a security is determined by a risk-free rate of return plus a risk premium, which is proportional to the non-diversifiable (systematic) risk of a security. Systematic risk refers to the risk associated with movements in the macro-economy (the economic "system") and, thus, cannot be eliminated through diversification by holding a portfolio of securities. The beta coefficient (β) is a statistical measure that attempts to quantify the non-diversifiable risk of the return on a particular security against the returns inherent in general stock market fluctuations. The formula is expressed as follows:

$$k = r_f + \beta(r_m - r_f), \qquad \text{(i)}$$

where "k" is the cost of equity capital of an individual security, "r_f" is the risk-free rate of return, "β" is the beta coefficient, "r_m" is the average market return and "$r_m - r_f$" is the market risk premium. The CAPM is used in my analysis, not as a primary cost of equity analysis, but as a check of the DCF cost of equity estimate. Although I believe the CAPM can be useful in testing the reasonableness of a cost of capital estimate, certain theoretical shortcomings of this model (when applied in cost of capital analysis) reduce its usefulness.

Q. CAN YOU EXPLAIN WHY THE CAPM ANALYSIS SHOULD BE APPLIED TO COST OF CAPITAL ESTIMATION WITH CAUTION?

A. Yes. The reasons why the CAPM should be used in cost of capital analysis with caution

are set out below. It is important to understand that my caution with regard to the use of the CAPM in a cost of equity capital analysis does not indicate that the model is not a useful description of the capital markets. Rather, it recognizes that in the practical application of the CAPM to cost of capital analysis there are problems that can cause the results of that type of analysis to be less reliable than other, more widely accepted models such as the DCF.

The CAPM was originally designed as a point-in-time tool for selecting stock portfolios that matched a particular investor's risk/return preference. Its use in rate of return analysis to estimate multi-period return expectations for one stock or one type of stock, rather than a diversified portfolio of stocks, takes the model out of the context for which it was intended. Also, questions regarding the fundamental applicability of the CAPM theory and the accuracy of beta have arisen recently in the financial literature.

For many years there has been much comment in the financial literature regarding the strength of the assumptions that underlie the CAPM and the inability to substantiate those assumptions through empirical analysis. Also, there are problems with the key CAPM risk measure, beta, that indicate that the CAPM analysis is not a reliable primary indicator of equity capital costs.

Cost of capital analysis is a decidedly forward-looking, or *ex-ante*, concept. Beta is not. The measurement of beta is derived with historical, or *ex-post*, information. Therefore, the beta of a particular company, because it is usually derived with five years of historical data, is slow to change to current (i.e., forward-looking) conditions, and some price abnormality that may have happened four years ago could substantially affect beta while, currently, being of little actual concern to investors. Moreover, this same shortcoming, which assumes past results mirror investor expectations for the future plagues the market risk premium in an historically-oriented CAPM. As I discussed in Section I of my testimony, recent studies indicate that investors current market risk premium expectations are well below simple historical averages.

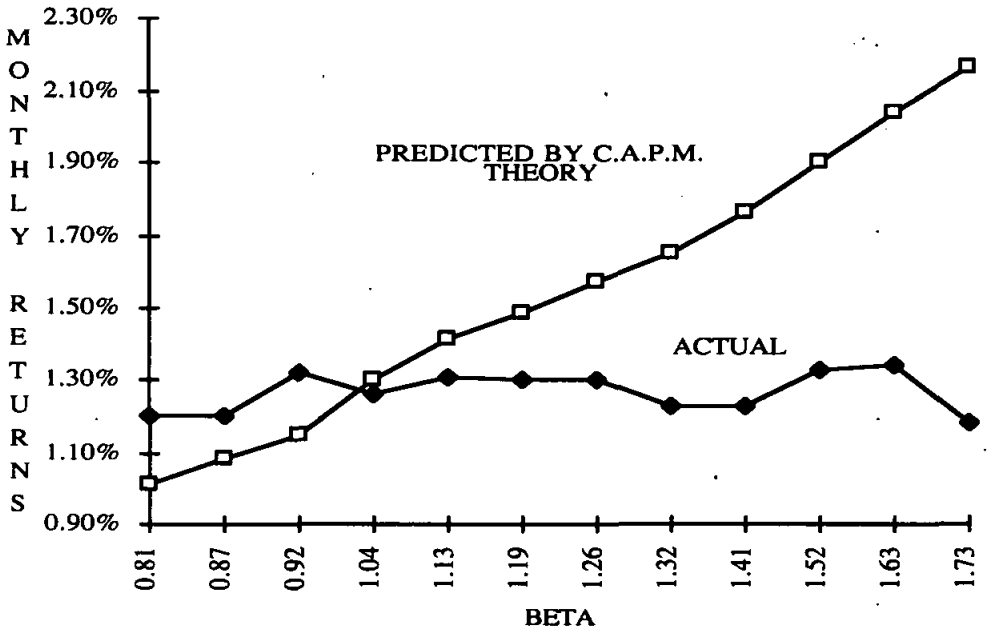
Also, an important study performed for the Center for Research in Security Prices

at the University of Chicago Graduate School of Business shows that the assumed linear relationship between beta, risk and return (i.e., beta varies directly with risk and return) simply does not appear to exist in the marketplace. As Value Line reported in its Industry Review published in March of 1992:

> Two of the most prestigious researchers in the financial community, Professors Eugene F. Fama and Kenneth R. French from the University of Chicago have challenged the traditional relationship between Beta and return in a recent paper published by the Center for Research in Security Prices. In this study, the duo traced the performance of thousands of stocks over 50 years, but found no statistical support for the hypothesis that the relationship between volatility and return is significantly different from random. (Value Line Industry Review, March 13, 1992, p. 1-8.)

A graphical summary of the findings published in the 1992 Fama and French article regarding the efficacy of beta in the CAPM is shown below in Chart I:

CHART I.
MONTHLY STOCK RETURNS v. BETA
1963-1990



Graphing monthly returns against the average beta for the different stock groupings presented by Fama and French shows that the actual risk/return relationship that has existed over the 1963-1990 period (labeled "actual" in Chart I) is vastly different from that predicted by the CAPM theory. For example, Fama and French found that there was little difference in the average monthly returns of stocks with high betas (beta = 1.73, monthly return = 1.18%) and stocks with low betas (beta = 0.81, monthly return = 1.20%), while the assumption embodied in the CAPM is that the returns for those types of stocks should be substantially different. These findings led the researchers to conclude:

> In short, our tests do not support the most basic prediction of the SLB [Sharpe-Litner-Black, CAPM] model, that average returns are positively related to market ßs. (Id., p. 428)

There are other, more practical, problems with beta. For example, there are many purveyors of beta and betas are calculated in different ways. Although the theory calls for

beta to be measured as the covariance of the returns of one stock against that of the market, some beta providers simply use stock price changes in lieu of changes in total return.[1] Also, while an historical period of monthly returns (or stock prices) over five years is common, some providers use shorter periods in order to get more current risk indications. The differences in the calculation techniques can lead to very different beta results. For example, the average Value Line beta of the electric utility sample group used in my testimony is 0.91. That beta is calculated based on stock price movements over a five-year period. For the same companies, the New York Stock Exchange (NYSE) publishes betas calculated using relative return variances over a three-year period. Those betas average 0.64 for the same companies. That difference in published betas can make creates a very large variance in the CAPM equity cost estimate. Given a market risk premium ranging from 4% to 6.5%, could cause an 100 to 175 basis point difference in the CAPM estimate of the cost of equity of those companies.

Fama and French have continued their investigation of the CAPM since their 1992 article and have postulated that a more accurate CAPM would use two additional risk measures in addition to beta. However, it is important to note that while those authors tout the superiority of their three-factor CAPM to the single-beta CAPM on theoretical grounds, they recognize that there are significant problems with any type of asset pricing model when it comes to using the model to estimate the cost of equity capital. Most recently, Fama and French noted regarding the CAPM:

> "The attraction of the CAPM is that is offers powerful and intuitively pleasing predictions about how to measure risk and the relation between expected return and risk. Unfortunately, the empirical record of the model is poor—poor enough to invalidate the way it is used in applications. The CAPM's empirical problems may reflect theoretical failings, the result of many simplifying assumptions. But they may also be caused by difficulties in implementing valid tests of the model....In the end, we argue that whether the model's problems reflect

[1] Value Line, for example, uses historical market prices rather than the covariance of returns.

> weaknesses in the theory or in its empirical implementation, the failure of the CAPM in empirical tests implies that most applications of the model are invalid." (Fama, E., French, K., "The Capital Asset Pricing Model: Theory and Evidence," *Journal of Economic Perspectives*, Vol. 18, No. 3, Summer 2004, pp. 25-46)

While the recently published conclusions as to the imprecision of equity cost estimates produced by CAPM-type models does not negate the risk/return basis or the general theory of asset pricing, they do call for more accurate measures with which asset returns can be more reliably indexed. However, unless and until such indices are published and widely accepted in the marketplace, CAPM cost of equity capital estimates should be relegated to a supporting role or informational status. Therefore, I use the CAPM for informational purposes and do not rely on that methodology as a primary equity capital cost estimation technique.

Q. WHAT VALUE HAVE YOU CHOSEN FOR A RISK-FREE RATE OF RETURN IN YOUR CAPM ANALYSIS?

A. As the CAPM is designed, the risk-free rate is that rate of return investors can realize with certainty. The nearest analog in the investment spectrum is the 13-week U. S. Treasury Bill. However, T-Bills can be heavily influenced by Federal Reserve policy, as they have been over the past three years. While longer-term Treasury bonds have equivalent default risk to T-Bills, those longer-term government securities carry maturity risk that the T-Bills do not have. When investors tie up their money for longer periods of time, as they do when purchasing a long-term Treasury, they must be compensated for future investment opportunities forgone as well as the potential for future changes in inflation. Investors are compensated for this increased investment risk by receiving a higher yield on T-Bonds. However, when T-Bills and T-Bonds exhibit a "normal" (historical average) spread of about 1.5% to 2%, the results of a CAPM analysis that matches a higher market risk premium with lower T-Bill yields or a lower market risk premium with higher T-Bond yields, are very similar.

As I noted in my previous discussion of the macro-economy, the Fed has acted vigorously during the past year or so to raise short-term interest rates. Over the most recent six-week period, T-Bills have produced an average yield of 4.99% and Treasury Bonds have yielded 4.64% (data from Value Line *Selection & Opinion*, six most recent weekly editions[2]). Those data indicate that, currently, there is an abnormal yield differential between long- and short-term Treasury securities.

Q. DO YOU BELIEVE THE USE OF A LONG-TERM TREASURY BOND RATE IS APPROPRIATE IN THE CAPM?

A. In the current economic environment, the use of a long-term Treasury bond produces a more accurate estimate of investors' cost of equity. Although the selection of a long- or short-term Treasury security as the risk free rate of return to be used in the CAPM is one of the areas of contention in applying the model in cost of capital analysis, the use of a normalized short-term T-Bill rate is the more prevalent in the literature. However, as noted above the T-Bill yield can be influenced by Federal Reserve policy, and, would produce inaccurate indications of the cost of equity, especially if the yield differential between T-Bonds and T-Bills is different from long-term averages as they are now.

For example, in 2004 when the Fed had pushed T-Bill rates below 2% and the yield differential between T-Bonds and T-Bills was unusually large, the results of a T-Bill-based CAPM for utilities were below bond yields and were not reliable. Recently, with the Fed pushing up short-term T-Bill yields resulting through credit tightening, combined with stable long-term yields, the yield differential between T-Bonds and T-Bills is effectively non-existent, which is well below long-term averages of about 1.8% to 2.1%. Therefore, the short-term CAPM will overstate the cost of equity. For purposes of analysis in this proceeding I will rely on the long-term Treasury bond yields for the risk-free rate in the CAPM. Also, along with those measures of the risk-free rate I use the corresponding measures of market risk premiums.

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[2] Current T-Bill yield, six-week average yield from Value Line Selection & Opinion (4/20/07-5/25/07).

Q. WHAT HAVE YOU CHOSEN AS THE MARKET RISK PREMIUM FOR THE CAPM ANALYSIS?

A. In their 2007 edition of Stocks, Bonds, Bills and Inflation, Morningstar indicates that the average market risk premium between stocks and T-Bills over the 1926–2006 time period is 6.5% (based on an arithmetic average), and 5.0% (based on a geometric average). I have used these values to estimate the market risk premium in the CAPM analysis. The geometric mean is based on compound returns over time and the arithmetic mean is based on the average of single-period returns.

It is also important to note that, as I point out in Section I of my testimony, recent research in the field of financial economics has shown that the market risk premium data published by Morningstar—the earned return differentials that existed in the U.S. between 1926 and 2005—overstates investor-expected market risk premiums. The most recent research indicates that the return investors require over the risk-free rate ranges from 2.5% to 4.5% as opposed to the 4.9% to 6.5% estimate published by Morningstar. Also Ibbotson, the originator of the historical return service recently purchased by Morningstar, has published a recent paper that indicates the forward-looking risk premium expectation ranges between 3.97% and 5.90%.[3] Therefore, the upper end of the CAPM cost of equity estimates, based on the historical Morningstar data, should be considered to be considerably higher than the current cost of common equity capital.

Q. SOME ANALYSTS ARGUE THAT THE USE OF GEOMETRIC MEANS IN COST OF CAPITAL ANALYSIS IS IMPROPER. WHY DO YOU BELIEVE IT IS REASONABLE TO USE THAT INFORMATION?

A. It is necessary to utilize a range of market risk premiums when applying a CAPM analysis because, as I note in Section I of my Direct Testimony, there is substantial new research that indicates the published Morningstar historical data significantly overstate

[3] Ibbotson, R, Chen, P., "Long-Run Stock Returns: Participating in the Real Economy," *Financial Analysts Journal*, January/February 2003, pp. 88-89.

investors' expectations with regard to the market risk premium. Also, Morningstar, while stating a preference for the arithmetic market risk premium, also publish the geometric market risk premium and investors have equal access to those data. Therefore, it is reasonable to believe, under the assumption of informationally-efficient markets, that such data is impounded in stock prices.

Also the "decision tree" rationale often used to support sole reliance on arithmetic means assumes that year-to-year returns are strictly independent results—each having no affect on the other. However, there is research that indicates such is not the case and that period-to-period returns are inter-dependent to some degree.[4] Therefore, the very strict "decision tree" logic often used to support allegiance to an arithmetic market risk premium does not apply. Even academics that use arithmetic means of historical data recognize that if historical returns are not strictly independent (i.e., they are "serially correlated," or the data are "mean reverting"), then the arithmetic mean does not provide a valid representation of the historical average return:

> If, however, the objective is to obtain the *median* future value of the investment, then the initial investment should be compounded at the geometric sample average. When returns are serially correlated, then the arithmetic average [footnote] can lead to misleading estimates and thus the geometric average may be the more appropriate statistic to use.
>
> [footnote] The point is well illustrated by the textbook example where an initial investment of $100 is worth $200 after one year and $100 after two years. The arithmetic average return is 25% whereas the geometric average return is 0%. The latter coincides with the true return. (Mehra, R., Prescott, E., "The Equity Premium in Retrospect," Handbook of the Economics of Finance, Constantinides, Harris, Stultz, Editors, 2003)

Also, in a white paper presented to the Social Security Administration in 2001 regarding

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[4] E. Fama and K. French, "Dividend Yields and Expected Stock Returns," *Journal of Financial Economics* (October 1988), pp. 3-26.

expected equity returns in the 21st Century, Professor John Campbell of Harvard had the following comments regarding geometric means:

> When returns are negatively serially correlated, however, the arithmetic average is not necessarily superior as a forecast of long-term future returns. To understand this, consider an extreme example in which prices alternate deterministically between 100 and 150. The return is 50% when prices rise, and –33% when prices fall. Over any even number of periods, the geometric average return is zero, but the arithmetic average return is 8.5%. In this case the arithmetic average return is misleading because it fails to take account of the fact that high returns always multiply a low initial price of 100, while low returns always multiply a high initial price of 150. The geometric average is a better indication of long-term future prospects in this example. [footnote omitted]
>
> The point here is not just a theoretical curiosity, because in the historical data summarized by Siegel, there is strong evidence that the stock market is mean-reverting. That is, periods of high returns tend to be followed by periods of lower returns. This suggests that the arithmetic average return probably overstates expected future returns over long periods." (Estimating the Real Rate of Return on Stocks Over the Long Term, Papers by Campbell, Diamond, Shoven, Presented to the Social Security Advisory Board, August 2001; Cambell, J., "Forecasting U.S. Equity Returns in the 21st Century", pp. 3, 4)

Finally, there are data anomalies associated with arithmetic risk premiums. In order to calculate arithmetic risk premiums based on a market index like the S&P 500 or the NYSE, it is commonly assumed that those indexes are bought and sold each year without transaction costs or tax consequences. That is unrealistic. Also, the arithmetic market risk premium is period-specific. That is, the longer the assumed holding period the lower the arithmetic risk premium.

It is commonly assumed that the holding periods (the amount of time between buying and selling the market portfolio) is one year, however, there is no magic to that particular time-span, it is simply a common assumption in the calculation. If, for

example, we assume that the holding period is two years instead of three, the arithmetic market risk premium declines. If that holding period increases to three years, the market risk premium based on the Ibbotson data declines again.[5]

In sum, the Morningstar arithmetic mean is at the uppermost end of the current range of market risk premium estimates according to recent research, and even that measure declines as the holding period increases. Therefore consideration of a lower bound for the determination of a CAPM cost of equity (Morningstar's geometric mean) is reasonable for the purposes of determining the cost of common equity capital for APS.

Q. WHAT VALUE HAVE YOU CHOSEN FOR THE BETA COEFFICIENT IN THE CAPM ANALYSIS?

A. Value Line reports beta coefficients for all the stocks it follows. Value Line's beta is derived from a regression analysis between weekly percentage changes in the market price of a stock and weekly percentage changes in the New York Stock Exchange Composite Index over a period of five years. The average beta coefficient of the sample of electric companies is 0.92.

Value Line's betas for electric companies have increased to uncharacteristically high levels over the past year or so, with some electric utility betas exceeding that of the market in general. As I noted previously, Value Line's betas are based on market price movements and because utility stock price movements are normally less volatile than those of the market, electric utility betas have, for many years have been in the 0.50 to 0.80 range. For example, in a 2002 Savannah Gas & Electric rate proceeding in Georgia the average beta coefficient used in my CAPM analysis for a group of electric utilities was 0.55—and that was at the height of the western energy trading crisis and a low point for the electric utility industry.[6]

Over the past few years, with the uncertainty in the global political economy, the

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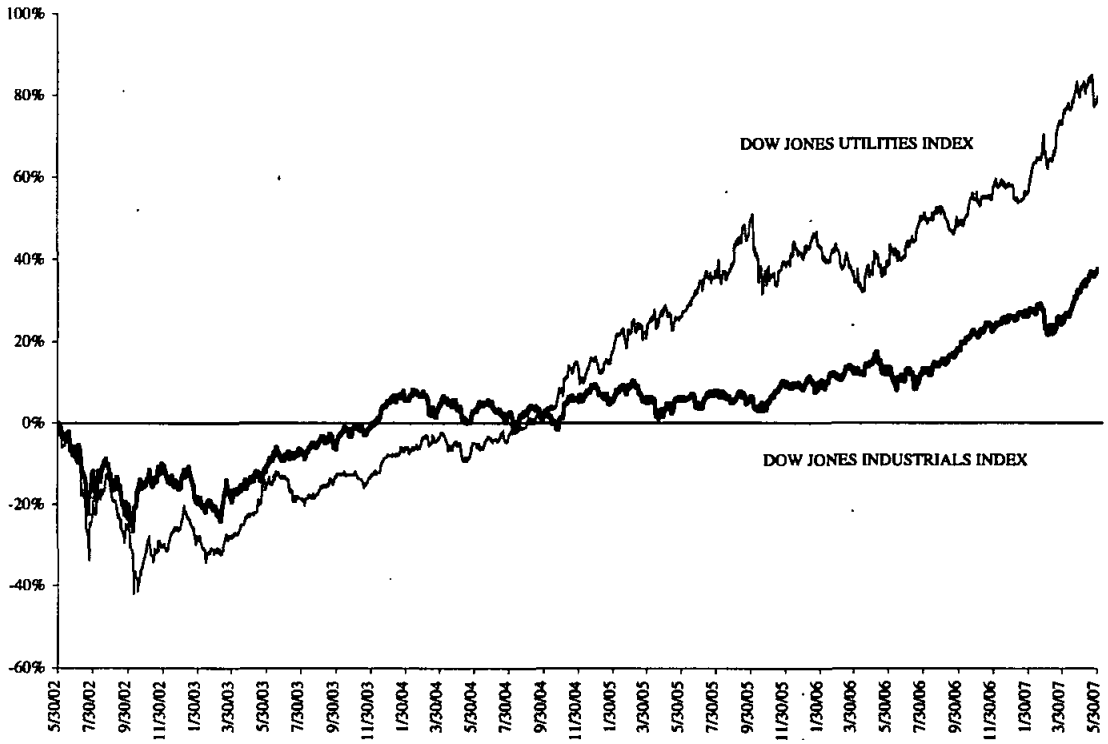
[5] Copeland, Koller, and Murrin, Valuation: Measuring and Managing the Value of Companies, 3rd Ed., McKinsey & Co., New York, 2006, pp. 218-221.

[6] Direct Testimony of Stephen G. Hill, Docket No. 14618-U, Savannah Gas & Electric Company, before the Georgia Public Service Commission, filed March 15, 2002.

changes in the prices of utility stocks have been more dramatic than that of the market in general, and that unusual price volatility has substantially increased Value Line's published betas. In addition, as shown in Chart II below, over the past five years (the time period over which betas are usually calculated) utility stock prices have been more volatile than that of the market. That is not a normal circumstance that investors would expect to continue into the future.

Chart II.

Relative Volatility of Dow Jones Industrials and Utilities



Data from http://finance.msn.com, historical prices, $INDU, $UTIL).

As a result, the Value Line betas, based on that historical price information over the past five years would tend to overstate investors' long-term expectations regarding relative risk.

Finally, I should point out that Value Line is not the only purveyor of beta

coefficients. Other investor services such as Reuters and the New York Stock Exchange also report betas, and as shown in Table I below, the published betas can be very different.

Table I

Published Betas for Hill Sample Group

	BETA		
	Value Line	Reuters	NYSE
FirstEnergy Corp.	0.85	0.48	0.58
Northeast Utilities	0.90	0.38	0.68
Progress Energy	0.90	0.62	0.65
Southern Company	0.70	0.03	0.48
Alliant Energy	0.95	0.66	0.67
Ameren Corp.	0.75	0.36	0.51
American Electric Power	1.35	0.99	0.69
Cleco Corporation	1.30	1.35	0.97
DPL, Inc.	0.95	0.88	0.71
Empire District Electric	0.85	0.63	0.71
Entergy Corp.	0.85	0.30	0.65
Hawaiian Electric	0.75	0.44	0.71
PNM Resources	0.95	0.95	0.75
Pinnacle West Capital	1.00	0.82	0.57
Unisource Energy	0.75	0.43	0.31
Average	0.92	0.62	0.64
Median	0.90	0.62	0.67

Q. IF THE MORNINGSTAR MARKET RISK PREMIUM DATA OVERSTATE THE EXPECTED MARKET RISK PREMIUM, AND RECENT VALUE LINE BETAS ALSO TEND TO EXAGGERATE THE CAPM RESULT, WHY DO YOU USE THOSE DATA IN YOUR CAPM ESTIMATE OF THE COST OF COMMON EQUITY CAPITAL?

A. I continue to utilize the historical Morningstar data as well as Value Line betas in my CAPM analysis in order to be consistent with the manner in which I have traditionally used those data. I have been testifying on the subject of the cost of equity capital for

twenty-five years and have consistently used the Morningstar historical market risk premium data and Value Line betas in my CAPM analyses, and choose not to deviate from that practice at this time.

However, it is my judgment that the electric utility betas published by Value Line overstate the relative risk of those companies and I expect that the Value Line betas will ultimately be self-correcting and decline as utility market price movements return to long-term averages relative to the stock market. Also, the new research on the market risk premium indicates that the market risk premium expected by investors is considerably lower than the risk premium contained in the Morningstar historical data. While that information has not yet caused me to change my long-standing CAPM methodology of relying on the Morningstar historical risk premium data, the current research on the topic of the market risk premium is important, deserves consideration and causes me to put little weight on the higher end of my CAPM estimates.

Q. WHAT IS YOUR COST OF EQUITY ESTIMATE FOR THE SAMPLE OF ELECTRIC COMPANIES USING THE CAPITAL ASSET PRICING MODEL ANALYSIS?

A. DOD-211 shows that the average Value Line beta coefficient for the group of electric companies under study is 0.92. The overall arithmetic average market risk premium of 6.5% would, upon the adoption of a 0.92 beta, become a sample group premium of 5.98% (0.92 x 6.5%). That non-specific risk premium added to the risk-free T-Bond rate of 4.85%, previously derived, yields a common equity cost rate estimate of 10.83%. Using the geometric market risk premium of 5.00% with the current T-Bond yield produces a CAPM estimate of 9.45%. Given the recent research on the market risk premium, and the unusually high betas for electric utilities currently, it is reasonable to believe that the CAPM result based on Morningstar's historical geometric mean market risk premium provides a more accurate estimate of investors' return requirements and the cost of equity capital.

MODIFIED EARNINGS-PRICE RATIO ANALYSIS

Q. PLEASE DESCRIBE THE MODIFIED EARNINGS-PRICE RATIO (MEPR) ANALYSIS OF THE COST OF COMMON EQUITY CAPITAL.

A. The earnings-price ratio is calculated simply as the expected earnings per share divided by the current market price. In cost of capital analysis, the earnings-price ratio (which is one portion of this analysis) can be useful in a corroborative sense, since it can be a good indicator of the proper range of equity costs when the market price of a stock is near its book value. When the market price of a stock is *above* its book value, the earnings-price ratio *understates* the cost of equity capital. DOD-212 contains mathematical proof for this concept. The opposite is also true, i.e.; the earnings-price ratio *overstates* the cost of equity capital when the market price of a stock is *below* book value.

Under current market conditions, the electric utilities under study have a median market-to-book ratio of 1.83 and, therefore, the average earnings-price ratio alone will understate the cost of equity for the sample groups. However, I do not use the earnings-price ratio alone as an indicator of equity capital cost rates. Because of the relationship among the earnings-price ratio, the market-to-book ratio and the investor-expected return on equity described mathematically in DOD-212, I have modified the earnings-price ratio analysis by including expected returns on equity for the companies under study. It is that modified analysis that I will use to assist in estimating an appropriate range of equity capital costs in this proceeding.

Q. PLEASE EXPLAIN THE RELATIONSHIP AMONG THE EARNINGS-PRICE RATIO, THE EXPECTED RETURN ON BOOK EQUITY, AND THE MARKET-TO-BOOK RATIO.

A. When the expected return (ROE) approximates the cost of equity, the market price of the utility approximates its book value and the earnings-price ratio provides an accurate estimate of the cost of equity. As the investor-expected return on equity for a utility

(ROE) begins to exceed the investor-required return (the cost of equity capital), the market price of the firm will tend to exceed its book value. As shown in DOD-212, when the market price begins exceeds book value, the earnings-price ratio begins understates the cost of equity capital.

If the cost of equity capital doesn't change and expected returns (ROE) move higher, the market price continues to move higher than book value and the earnings-price ratio continues to decline below the cost of capital. In other words, the earnings-price ratio and the expected ROE tend to "orbit" around the cost of equity capital. When market prices are near book value, both parameters approximate the cost of equity. If the market-to-book ratio increases due to differences between the cost of capital and expected returns, the expected ROE moves higher than the cost of capital and the earnings-price ratio moves lower than the cost of equity capital. The reverse happens when market-to-book ratios decline below 1.0. In that instance, expected ROEs are lower than the cost of equity capital and price-earnings ratios are higher. The key to this analysis is that the "locus" of the expected ROE and the price-earnings ratio is the cost of common equity capital.

These relationships represent general tendencies but are useful in corroborating other cost of capital methodologies. The Federal Energy Regulatory Commission, in its generic rate of return hearings, found this technique useful and indicated that under the circumstances of market-to-book ratios exceeding unity, the cost of equity is bounded above by the expected equity return and below by the earnings-price ratio (e.g., 50 Fed Reg, 1985, p. 21822; 51 Fed Reg, 1986, pp. 361, 362; 37 FERC ¶ 61,287). The mid-point of these two parameters, therefore, produces an estimate of the cost of equity capital which, when market-to-book ratios are different from unity, provides a corroborative estimate of the cost of common equity.

These concepts are also supported by Brealy & Meyers, an authority on which Dr, Morin relies in his testimony. At pages 72 and 73 of their most recent text[7] indicate that

[7] Brealey, R., Meyers, S., Allen, F., Principles of Corporate Finance, 8th Edition, McGraw-Hill, Irwin, Boston MA, 2006.

the earnings price ratio can equal the cost of equity for a growing firm, as long as the company is expected to earn a return equal to the market capitalization rate (the cost of equity). If the expected return is greater than the cost of equity, the present value of that growth opportunity will be positive and add to the firm's stock price. In that instance the earnings-price ratio will understate the cost of equity capital. That situation is analogous to a utility firm with a market price above book value, which as I've noted above indicates, 1) the expected return exceeds the cost of equity and 2) the current earnings-price ratio understates the cost of equity. The midpoint of those two parameters, then provides another estimate of their locus—the firm's cost of equity capital.

Q. WHAT ARE THE RESULTS OF YOUR MODIFIED EARNINGS-PRICE RATIO ANALYSIS OF THE COST OF EQUITY FOR THE SAMPLE GROUP OF ELECTRIC UTILITIES?

A. DOD-213 shows the Reuters projected 2008 per share earnings for each of the firms in the sample groups. Recent average market prices (the same market prices used in my DCF analysis), Value Line's projected return on equity for 2008 and 2010-2012 for each of the companies are also shown.

The average earnings-price ratio for the electric sample group, 6.18%, is below the cost of equity for those companies due to the fact that their average market-to-book ratio is currently above unity (median electric utility M/B = 1.83). The sample electric companies' 2008 expected book equity return averages 11.17%. For the electric sample group, then, the mid-point of the earnings-price ratio and the current equity return is 8.68%.

DOD-213, also shows that the average expected book equity return for the electric utilities over the next three- to five-year period declines slightly to 10.90%. The midpoint of the long-term projected return on book equity (10.90%) and the current earnings-price ratio (6.18%) is 8.54%. That longer-term analysis provides another forward-looking estimate of the equity capital cost rate of electric utility firms. The results of this MEPR

analysis indicate that the DCF equity cost estimate previously derived may be overstated (i.e., too high).

MARKET-TO-BOOK RATIO ANALYSIS

Q. PLEASE DESCRIBE YOUR MARKET-TO-BOOK (MTB) ANALYSIS OF THE COST OF COMMON EQUITY CAPITAL.

A. This technique of analysis is a derivative of the DCF model that attempts to adjust the capital cost derived with regard to inequalities that might exist in the market-to-book ratio. This method is derived algebraically from the DCF model and, therefore, cannot be considered a strictly independent check of that method. However, the MTB analysis is useful in a corroborative sense. The MTB seeks to determine the cost of equity using market-determined parameters in a format different from that employed in the DCF analysis. In the DCF analysis, the available data is "smoothed" to identify investors' long-term sustainable expectations. The MTB analysis, while based on the DCF theory, relies instead on point-in-time data projected one year and five years into the future and, thus, offers a practical corroborative check on the traditional DCF. The MTB formula is derived as follows:

Solving for "P" from Equation (1), the standard DCF model, we have

$$P = D/(k-g). \qquad \text{(ii)}$$

But the dividend (D) is equal to the earnings (E) times the earnings payout ratio, or one minus the retention ratio (b), or

$$D = E(1-b). \qquad \text{(iii)}$$

Substituting Equation (iii) into Equation (ii), we have

$$P = \frac{E(1-b)}{k-g} \quad . \qquad \text{(iv)}$$

The earnings (E) are equal to the return on equity (r) times the book value of that equity (B). Making that substitution into Equation (iv), we have

$$P = \frac{rB(1-b)}{k-g} \quad . \qquad \text{(v)}$$

Dividing both sides of Equation (v) by the book value (B) and noting from Equation (iii) in Appendix B that g = br+sv,

$$\frac{P}{B} = \frac{r(1-b)}{k-br-sv} \quad . \qquad \text{(vi)}$$

Finally, solving Equation (vi) for the cost of equity capital (k) yields the MTB formula:

$$k = \frac{r(1-b)}{P/B} + br + sv. \qquad \text{(vii)}$$

Equation (vii) indicates that the cost of equity capital equals the expected return on equity multiplied by the payout ratio, divided by the market-to-book ratio plus growth. DOD-214 shows the results of applying Equation (vii) to the defined parameters for the electric utility firms in the comparable sample. For the electric utility sample group, page 1 of DOD-214 utilizes current year (2008) data for the MTB analysis while page 2 utilizes Value Line's 2010-2012 projections.

The MTB cost of equity for the sample of electric utility firms, recognizing a current median market-to-book ratio of 1.83 is 9.48% using the current year data and 9.27% using projected three- to five-year data. Those point-in-time estimates are slightly higher, on average, than my DCF equity cost estimate.

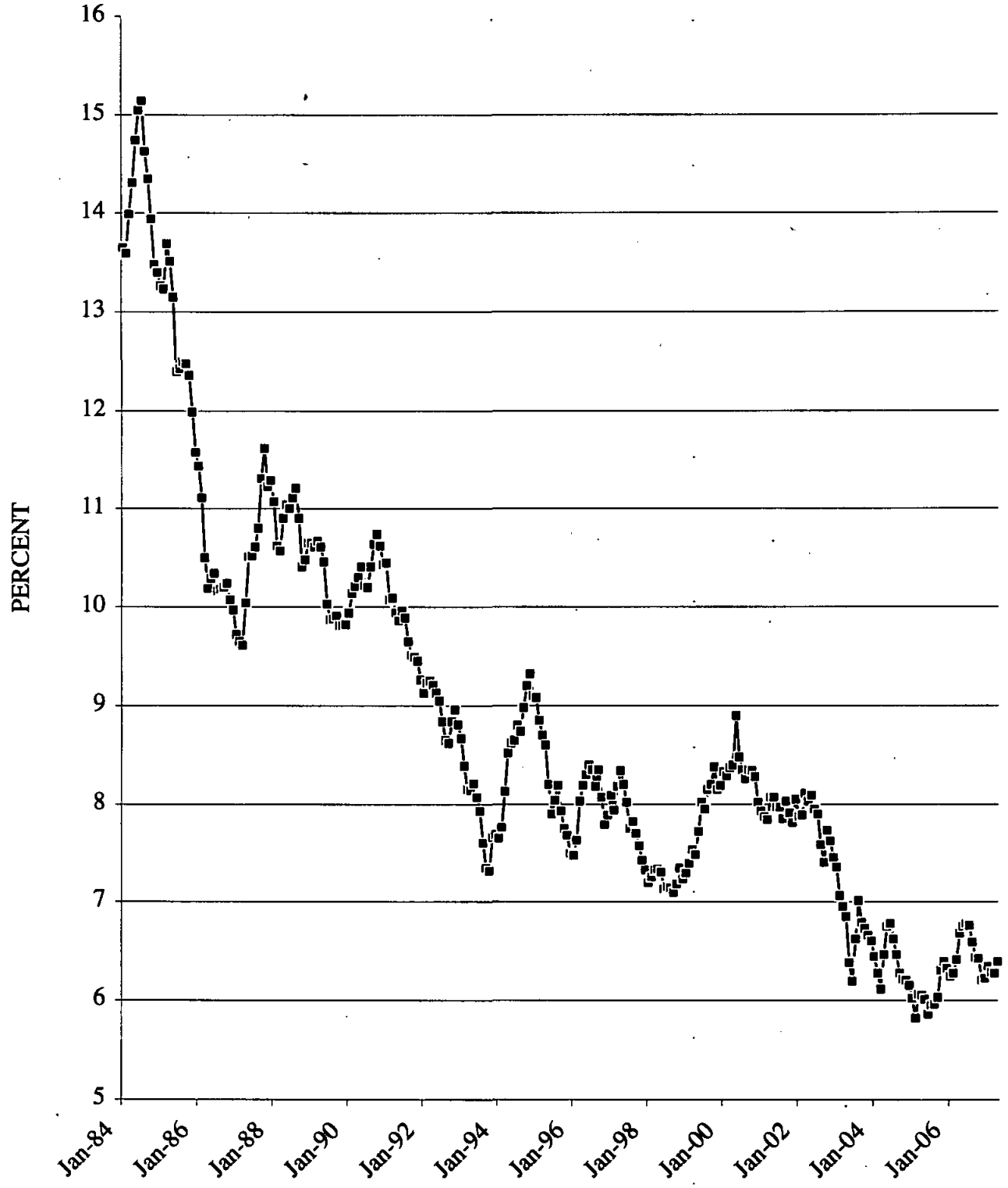
Q. DOES THIS CONCLUDE YOUR DISCUSSION OF YOUR CORROBORATIVE EQUITY COST ESTIMATION ANALYSES?

A. Yes.

HAWAIIAN ELECTRIC COMPANY

MOODY'S BAA BOND YIELDS

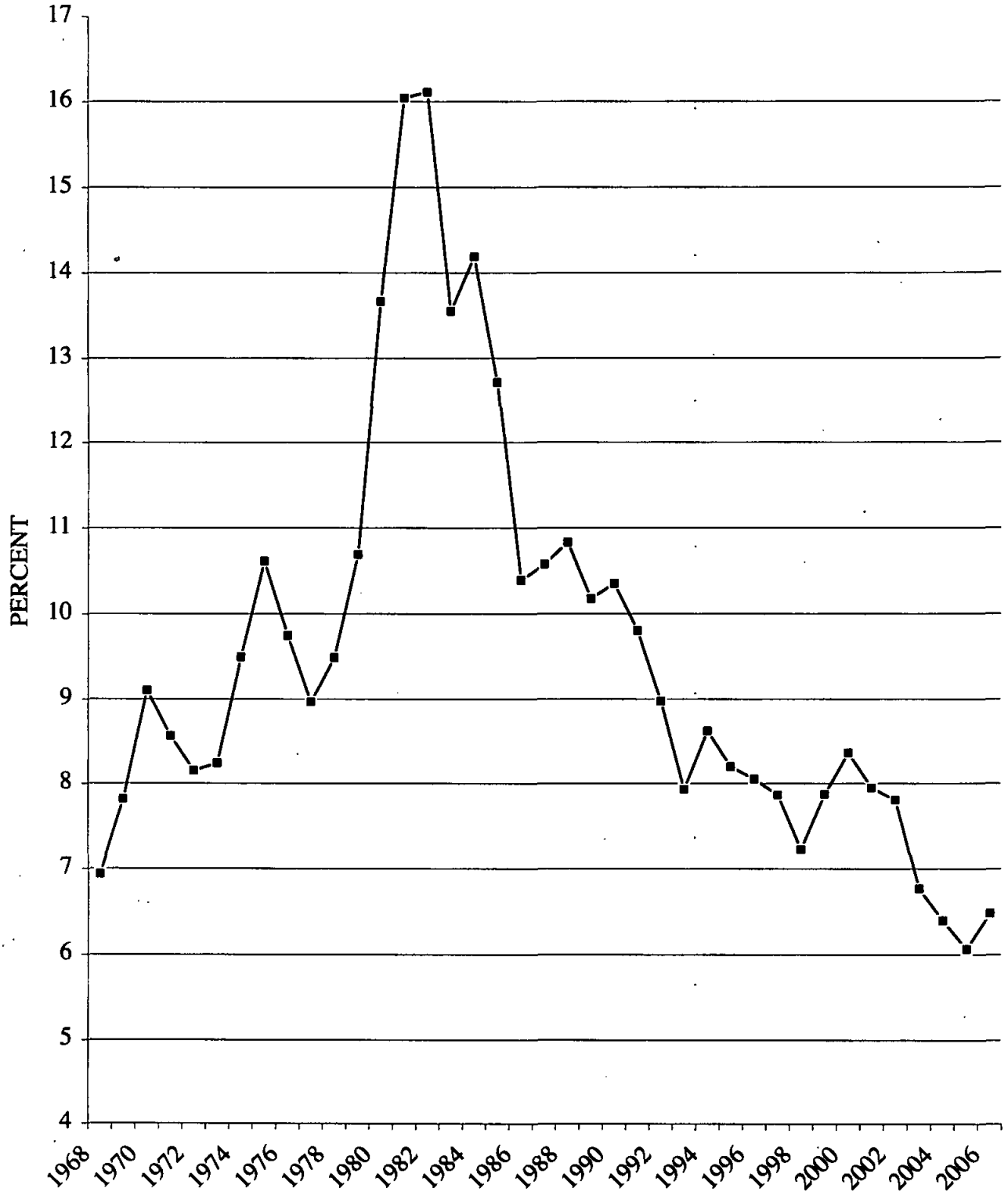
1984-2007



Data from Federal Reserve Release H.15.

HAWAIIAN ELECTRIC COMPANY

MOODY'S BAA BOND YIELDS
1968-2007



Data from Federal Reserve Release H.15.

HAWAIIAN ELECTRIC COMPANY
HISTORICAL CAPITAL STRUCTURE

AMOUNT (000,000)

Type of Capital	Mar-06 [1]	Jun-06 [2]	Sep-06 [3]	Dec-06 [4]	Mar-07 [5]	Average [6]
1) Common Equity	$660,603	$660,800	$675,791	$590,607	$594,931	**$636,546**
2) Preferred Stock	$22,293	$22,293	$22,293	$22,293	$22,293	**$22,293**
3) Long-term Debt	$449,159	$449,640	$449,667	$449,693	$519,426	**$463,517**
4) Hybrid Securities	$31,546	$31,546	$31,546	$31,546	$31,546	**$31,546**
5) Short-term Debt	$96,307	$106,876	$83,430	$58,707	$4,942	**$70,052**
6) TOTAL	$ 1,259,908	$ 1,271,155	$ 1,262,727	$ 1,152,846	$ 1,173,138	**$1,223,955**

PERCENTAGE

Type of Capital	Mar-06	Jun-06	Sep-06	Dec-06	Mar-07	5 Quarter Average
7) Common Equity	52.43%	51.98%	53.52%	51.23%	50.71%	**52.01%**
8) Preferred Stock	1.77%	1.75%	1.77%	1.93%	1.90%	**1.82%**
9) Long-term Debt	35.65%	35.37%	35.61%	39.01%	44.28%	**37.87%**
10) Hybrid Securities	2.50%	2.48%	2.50%	2.74%	2.69%	**2.58%**
11) Short-term Debt	7.64%	8.41%	6.61%	5.09%	0.42%	**5.72%**
12) TOTAL	100.00%	100.00%	100.00%	100.00%	100.00%	**100.00%**

Data from Company response to DOD-IR-05.

HAWAIIAN ELECTRIC COMPANY
HAWAIIAN ELECTRIC INDUSTRIES
ADJUSTED HISTORICAL CAPITAL STRUCTURE

AMOUNT (000,000)

Type of Capital	Mar-06 [1]	Jun-06 [2]	Sep-06 [3]	Dec-06 [4]	Mar-07 [5]	Average [6]
1) Common Equity	1,211,522	1,205,141	1,238,007	1,095,204	1,096,568	**1,169,288**
2) Preferred Stock	34,293	34,293	34,293	34,293	34,293	**34,293**
3) Long-term Debt	1,133,041	1,033,089	1,133,137	1,133,185	1,225,144	**1,131,519**
4) Short-term Debt	182,584	296,493	194,211	176,272	123,414	**194,595**
5) TOTAL	2,561,440	2,569,016	2,599,648	2,438,954	2,479,419	**2,529,695**

PERCENTAGE

Type of Capital	Mar-06	Jun-06	Sep-06	Dec-06	Mar-07	5 Quarter Average
6) Common Equity	47.30%	46.91%	47.62%	44.90%	44.23%	**46.22%**
7) Preferred Stock	1.34%	1.33%	1.32%	1.41%	1.38%	**1.36%**
8) Long-term Debt	44.23%	40.21%	43.59%	46.46%	49.41%	**44.73%**
9) Short-term Debt	7.13%	11.54%	7.47%	7.23%	4.98%	**7.69%**
10) TOTAL	100.00%	100.00%	100.00%	100.00%	100.00%	**52.42%**

Data from Company response to DOD-IR-05.

NOTE: The capital balances shown above do not include approximately $6 Billion of Bank debt and Deposit Liabilities and assume that 100% of HEI equity is attributable to HECO and non-bank corporate operations.

HAWAIIAN ELECTRIC COMPANY
ELECTRIC UTILITY INDUSTRY COMMON EQUITY RATIOS

ELECTRIC COMPANIES	EQUITY RATIO
Allegheny Energy	38%
ALLETE	63%
American Electric Power	43%
Central Vermont P.S.	58%
Cleco Corporation	57%
DPL, Inc.	32%
Duquesne Light Holdings	35%
Edison International	42%
El Paso Electric Co.	49%
FirstEnergy Corp.	44%
FPL Group	46%
Great Plains Energy	50%
Hawaiian Electric Industries	27%
IDACORP	49%
Maine & Maritimes Corp.	46%
OGE Energy	54%
Otter Tail Power	61%
Pinnacle West Capital Corp.	51%
Progerss Energy	47%
Southern Co.	42%
TXU Corp.	15%
UIL Holdings	48%
Westar Energy	50%

OVERALL INDUSTRY AVERAGE	**44%**
HILL'S SAMPLE GROUP AVG.	**44%**
MORIN'S INTEGRATED EL. AVG.	**43%**
MORIN'S MOODY'S EL. AVG.	**44%**

COMBINATION GAS & ELECTRIC COMPANIES	EQUITY RATIO
AES Corp.	12%
Alliant Energy	59%
Ameren Corp.	50%
Aquilla	48%
Avista Corp.	46%
Black Hills Corporation	59%
CenterPoint Energy	15%
CH Energy Group	55%
CMS Energy Corp.	22%
Consolidated Edison	47%
Constellation Energy	50%
Dominion Resources	40%
DTE Energy Company	39%
Duke Energy	55%
Empire District Electric	44%
Energy East Corp.	44%
Entergy Corp.	43%
Excelon Corp.	43%
Florida Pub. Utilities	46%
Integrys Energy Group	42%
MDU Resources	63%
MGE Resources	55%
NiSource Inc.	47%
Northeast Utilities	39%
Northwestern Corp.	52%
NSTAR	36%
Pepco Holdings	43%
PG&E Corp.	43%
PNM Resources	40%
PPL Corp.	39%
Public Service Ent. Group	37%
Puget Energy	39%
SCANA Corp.	44%
SEMPRA Energy	59%
Sierra Pacific Resources	39%
TECO Energy	31%
UniSource Energy	35%
Unitil Corp.	36%
Wisconsin Energy Corp.	41%
Xcel Energy Inc.	44%

Data from AUS Utility Reports, June 2007, pp. 8, 12.

HAWAIIAN ELECTRIC COMPANY
RATEMAKNG CAPITAL STRUCTURE

Type of Capital	PERCENT	COST RATE	WT. AVG. COST RATE
Common Equity	52.01%	-	-
Preferred Stock	1.82%	5.51%	0.10%
Hybrid Securities	2.58%	7.47%	0.19%
Long-term Debt	37.87%	6.09%	2.31%
Short-term Debt	5.72%	5.00%	0.29%
Totals	100.00%		

Cost rate data from HECO-1901, p.1.

HAWAIIAN ELECTRIC COMPANY
ELECTRIC UTILITY SAMPLE GROUP SELECTION

		Company Name	Revenues % Electric	Pending Merger?	Recent Div. Cut?	Generation Assets?	Stable Book Value?	Senior Bond Rating S&P	Senior Bond Rating Moody's	Selected
		SCREEN	≥70%	no	no	yes	yes	A to BBB-		
EAST										
	e	Allegheny Energy	83	no	yes	yes	no	BBB	Baa3	
	e+g	CH Energy	51	no	no	yes	yes	A	A2	
	e	Central Vermont P. S.	100	no	no	yes	no	BBB	-	
	e+g	Consolidated Edison	63	no	no	no	yes	A	A1	
	e+g	Constellation Energy	11	no	no	yes	yes	BBB+	Baa2	
	e+g	Dominion Resources	34	no	no	yes	yes	BBB+	Baa1	
	e+g	Duke Energy	50	yes	no	yes	yes	BBB	A2	
	e	Duquesne Light Holdings	78	yes	no	no	no	BBB+	Baa1	
	e+g	Energy East Corp.	57	no	no	yes	yes	BBB+	A3	
	e+g	Excelon Corp.	63	no	no	yes	yes	BBB	Baa1	
	e	FPL Group	78	no	no	yes	yes	A	Aa3	
	e	FirstEnergy Corp.	85	no	no	yes	yes	BBB	Baa1	√
	e+g	Northeast Utilities	82	no	no	yes	yes	BBB	Baa1	√
	e+g	NSTAR	81	no	no	no	yes	A+	A1	
	e+g	PPL Corporation	67	no	no	yes	no	A-	A3	
	e+g	Pepco Holdings, Inc.	52	no	no	no	no	BBB+	Baa1	
	e	Progress Energy	86	no	no	yes	yes	BBB	A3	√
	e+g	Public Service Ent. Gp.	62	no	no	yes	yes	A-	A3	
	e+g	SCANA Corp.	42	no	no	yes	yes	A-	A1	
	e	Southern Company	98	no	no	yes	yes	A	A2	√
	e+g	TECO Energy	60	no	yes	yes	no	BBB-	Baa2	
	e	UIL Holdings Corp.	100	no	no	no	yes	-	Baa2	
CENTRAL	e	ALLETE	84	no	no	yes	no	A	Baa1	
	e+g	Alliant Energy	72	no	no	yes	yes	A-	A2	√
	e+g	Ameren Corp.	81	no	no	yes	yes	BBB	Baa1	√
	e	American Eelectric Power	93	no	no	yes	yes	BBB	Baa1	√
	e+g	Aquila, Inc.	56	no	yes	yes	no	B+	B2	
	e+g	CMS Energy Corp.	49	no	yes	yes	no	BBB-	Baa2	
	e+g	CenterPoint Energy	19	no	no	no	no	BBB	Baa2	
	e	Cleco Corporation	96	no	no	yes	yes	BBB+	Baa1	√
	e	DPL Inc.	100	no	no	yes	yes	BBB	-	√
	e+g	DTE Energy	53	no	no	yes	yes	BBB+	A3	
	e	Empire District Electric	86	no	no	yes	yes	BBB+	Baa1	√
	e+g	Entergy Corp.	82	no	no	yes	yes	BBB-	Baa2	√
	e	Great Plains Energy	43	no	no	yes	yes	BBB	A3	
	e+g	Integrys Energy	16	no	no	yes	yes	A+	Aa2	
	e+g	MGE Energy	63	no	no	yes	yes	AA-	Aa3	
	e+g	NiSource Inc.	17	no	yes	yes	yes	BBB	Baa2	
	e	OGE Energy Corp.	45	no	no	yes	yes	BBB+	Baa2	
	e	Otter Tail Corp.	27	no	no	yes	yes	BBB+	A3	
	e	TXU Corp.	23	yes	yes	yes	no	BBB-	Baa2	
	e+g	Vectren Corp.	20	no	no	yes	yes	A	A3	
	e	Westar Energy	72	no	yes	yes	no	BB+	Baa3	
	e+g	Wisconsisn Energy	63	no	no	yes	yes	A-	A1	
WEST	e+g	Avista Corp.	49	yes	no	yes	yes	BBB-	Baa3	
	e+g	Black Hills Corp.	29	no	no	yes	yes	BBB	Baa1	
	e	Edison International	82	no	yes	yes	no	BBB+	Baa1	
	e	El Paso Electric	97	no	yes	yes	yes	BB-	Ba1	
	e	Hawaiian Electric	84	no	no	yes	yes	BBB	Baa2	√
	e	IDACORP, Inc.	99	no	yes	yes	yes	A-	A3	
	e+g	MDU Resources Group	5	no	no	yes	yes	A-	A2	
	e+g	PG&E Corp.	70	no	yes	yes	no	BBB	Baa1	
	e+g	PNM Resources	79	no	no	yes	yes	BBB	Baa2	√
	e	Pinnacle West Capital	79	no	no	yes	yes	BBB-	Baa2	√
	e+g	Puget Energy, Inc.	61	no	no	yes	yes	BBB	Baa2	
	e+g	Sempra Energy	40	no	no	yes	yes	A+	A1	
	e+g	Sierra Pacific Resources	94	no	yes	yes	no	BB+	Ba1	
	e+g	UniSource Energy	85	yes	no	yes	yes	BBB-	Baa2	√
	e+g	Xcel Energy, Inc.	78	no	yes	yes	no	BBB+	A3	

e= electric company; e+g=combination electric and gas company

Data from Value Line Ratings and Reports, March 30, May 11, and June 1, 2007 ; AUS Utility Reports, June 2007.

HAWAIIAN ELECTRIC COMPANY
DCF GROWTH RATE PARAMETERS
ELECTRIC UTILITIES

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
FE	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	0.4094	10.5%	4.30%	23.92	297.64	
2003	-0.0204	05.4%	-0.11%	25.13	329.84	
2004	0.3105	10.6%	3.29%	26.04	329.84	
2005	0.3979	10.2%	4.06%	27.86	329.84	
2006	0.5157	13.9%	7.17%	28.30	319.20	
AVERAGE GROWTH			3.74%	4.50%		1.76%
2007	0.5167	15.0%	7.75%		304.80	-4.51%
2008	0.4881	13.5%	6.59%		304.80	-0.50%
2010-2012	0.5238	13.5%	7.07%	5.50%	304.80	-0.92%

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
NU	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	0.5093	06.3%	3.21%	17.33	127.56	
2003	0.5323	06.9%	3.67%	17.73	127.70	
2004	0.3077	05.1%	1.57%	17.80	129.03	
2005	0.3061	05.1%	1.56%	18.46	131.59	
2006	0.1098	04.3%	0.47%	18.14	154.20	
AVERAGE GROWTH			2.10%	3.00%		4.86%
2007	0.4429	07.0%	3.10%		156.20	1.30%
2008	0.4645	08.0%	3.72%		158.20	1.29%
2010-2012	0.4556	08.0%	3.64%	3.50%	164.20	1.26%

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
PGN	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	0.4323	12.1%	5.23%	28.73	232.43	
2003	0.3372	10.9%	3.68%	30.26	246.00	
2004	0.2516	09.9%	2.49%	30.90	247.00	
2005	0.1905	09.0%	1.71%	31.90	252.00	
2006	-0.1805	06.1%	-1.10%	32.37	256.00	
AVERAGE GROWTH			2.40%	5.00%		2.44%
2007	0.1286	08.5%	1.09%		260.00	1.56%
2008	0.1448	09.0%	1.30%		263.00	1.36%
2010-2012	0.2125	09.0%	1.91%	1.50%	272.00	1.22%

HAWAIIAN ELECTRIC COMPANY
DCF GROWTH RATE PARAMETERS
ELECTRIC UTILITIES

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
SO	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	0.2649	15.1%	4.00%	12.15	716.90	
2003	0.2944	14.8%	4.36%	13.13	734.80	
2004	0.3107	14.9%	4.63%	13.86	741.80	
2005	0.3052	14.9%	4.55%	14.41	741.60	
2006	0.2667	13.8%	3.68%	15.23	746.40	
AVERAGE GROWTH			4.24%	1.00%		1.01%
2007	0.2889	13.5%	3.90%		765.00	2.49%
2008	0.2783	13.0%	3.62%		783.00	2.42%
2010-2012	0.2600	13.0%	3.38%	5.00%	805.00	1.52%

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
LNT	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	-0.6949	05.8%	-4.03%	19.89	92.30	
2003	0.3631	06.7%	2.43%	21.37	110.96	
2004	0.4486	08.2%	3.68%	22.13	115.74	
2005	0.5249	13.1%	6.88%	20.85	117.04	
2006	0.4417	09.1%	4.02%	22.83	116.13	
AVERAGE GROWTH			2.60%	-2.50%		5.91%
2007	0.4920	11.0%	5.41%		109.50	-5.71%
2008	0.4731	10.5%	4.97%		110.30	-2.54%
2010-2012	0.4582	09.5%	4.35%	4.00%	113.00	-0.54%

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
AEE	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	0.0451	09.9%	0.45%	24.93	154.10	
2003	0.1911	11.6%	2.22%	26.73	162.90	
2004	0.0993	09.1%	0.90%	29.71	195.20	
2005	0.1885	09.7%	1.83%	31.09	204.70	
2006	0.0451	08.5%	0.38%	31.40	206.60	
AVERAGE GROWTH			1.16%	5.00%		7.60%
2007	0.1390	09.0%	1.25%		208.60	0.97%
2008	0.1672	09.5%	1.59%		210.60	0.96%
2010-2012	0.2063	09.0%	1.86%	3.00%	216.60	0.95%

HAWAIIAN ELECTRIC COMPANY
DCF GROWTH RATE PARAMETERS
ELECTRIC UTILITIES

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
AEP	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	0.1608	13.7%	2.20%	20.85	338.84	
2003	0.3478	12.4%	4.31%	19.93	395.02	
2004	0.4636	12.2%	5.66%	21.32	395.86	
2005	0.4621	11.3%	5.22%	23.08	393.72	
2006	0.4755	12.0%	5.71%	23.73	396.67	
AVERAGE GROWTH			4.62%	-2.50%		4.02%
2007	0.4610	11.5%	5.30%		398.50	0.46%
2008	0.4452	11.5%	5.12%		400.00	0.42%
2010-2012	0.4500	12.5%	5.63%	5.50%	405.00	0.42%

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
CNL	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	0.4079	13.1%	5.34%	11.77	47.04	
2003	0.2857	12.5%	3.57%	10.09	47.18	
2004	0.3182	11.9%	3.79%	10.83	49.62	
2005	0.3662	10.7%	3.92%	13.69	49.99	
2006	0.3382	08.5%	2.88%	15.05	58.00	
AVERAGE GROWTH			3.90%	4.00%		5.38%
2007	0.2800	08.0%	2.24%		59.00	1.72%
2008	0.3077	08.0%	2.46%		60.00	1.71%
2010-2012	0.3143	10.0%	3.14%	6.50%	63.00	1.67%

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
DPL	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	-0.3056	10.8%	-3.30%	6.38	126.50	
2003	0.1376	14.6%	2.01%	7.13	126.50	
2004	0.4696	20.7%	9.72%	8.25	126.50	
2005	0.0103	11.9%	0.12%	8.14	127.53	
2006	0.3377	27.0%	9.12%	5.95	112.00	
AVERAGE GROWTH			3.53%	-1.00%		-3.00%
2007	0.3882	25.5%	9.90%		112.00	0.00%
2008	-0.0286	24.0%	-0.69%		112.00	0.00%
2010-2012	0.3684	18.5%	6.82%	5.00%	116.00	0.70%

HAWAIIAN ELECTRIC COMPANY
DCF GROWTH RATE PARAMETERS
ELECTRIC UTILITIES

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
EDE	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	-0.0756	07.8%	-0.59%	14.59	22.57	
2003	0.0078	07.8%	0.06%	15.17	24.98	
2004	-0.4884	05.8%	-2.83%	14.76	25.70	
2005	-0.3913	06.0%	-2.35%	15.08	26.08	
2006	0.0922	08.5%	0.78%	15.50	30.25	
AVERAGE GROWTH			-0.99%	2.00%		7.60%
2007	0.0154	08.0%	0.12%		31.25	3.31%
2008	0.2242	09.5%	2.13%		32.80	4.13%
2010-2012	0.3600	11.0%	3.96%	3.00%	33.00	1.76%

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
ETR	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	0.6359	10.9%	6.93%	35.24	222.42	
2003	0.5664	09.8%	5.55%	38.02	228.90	
2004	0.5191	11.0%	5.71%	38.26	216.83	
2005	0.5091	11.9%	6.06%	35.71	216.83	
2006	0.5519	12.5%	6.90%	38.55	202.60	
AVERAGE GROWTH			6.23%	4.50%		-2.31%
2007	0.6108	14.5%	8.86%		194.00	-4.24%
2008	0.5966	14.0%	8.35%		191.00	-2.90%
2010-2012	0.5445	13.0%	7.08%	6.50%	191.00	-1.17%

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
HE	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	0.2346	11.3%	2.65%	14.21	73.62	
2003	0.2152	10.8%	2.32%	14.36	75.84	
2004	0.0882	08.9%	0.79%	15.01	80.69	
2005	0.1507	09.7%	1.46%	15.02	80.98	
2006	0.0677	09.9%	0.67%	13.44	81.46	
AVERAGE GROWTH			1.58%	2.00%		2.56%
2007	0.0462	09.5%	0.44%		83.50	2.50%
2008	0.1143	10.0%	1.14%		85.50	2.45%
2010-2012	0.2914	12.0%	3.50%	0.50%	87.00	1.32%

HAWAIIAN ELECTRIC COMPANY
DCF GROWTH RATE PARAMETERS
ELECTRIC UTILITIES

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
PNM	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	0.4673	06.5%	3.04%	16.60	58.68	
2003	0.4696	06.3%	2.96%	17.84	60.39	
2004	0.5594	08.0%	4.48%	18.19	60.46	
2005	0.5031	08.2%	4.13%	18.70	68.79	
2006	0.5000	07.2%	3.60%	22.09	76.65	
AVERAGE GROWTH			3.64%	4.50%		6.91%
2007	0.5053	08.0%	4.04%		77.00	0.46%
2008	0.4769	08.0%	3.82%		80.00	2.16%
2010-2012	0.4049	07.5%	3.04%	5.50%	80.00	0.86%

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
PNW	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	0.3557	08.0%	2.85%	29.44	91.26	
2003	0.3135	08.1%	2.54%	31.00	91.29	
2004	0.2907	08.0%	2.33%	32.14	91.79	
2005	0.1384	06.5%	0.90%	34.57	99.08	
2006	0.3596	09.2%	3.31%	34.47	99.96	
AVERAGE GROWTH			2.38%	4.00%		2.30%
2007	0.2900	08.5%	2.47%		100.00	0.04%
2008	0.2806	08.5%	2.39%		100.00	0.02%
2010-2012	0.2515	08.5%	2.14%	2.50%	100.00	0.01%

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH	
UNS	RETENTION RATIO	EQUITY RETURN	"g"	BOOK VALUE ($/SHARE)	SHARES OUTST (MILLIONS)	SHARE GROWTH
2002	0.4845	07.6%	3.68%	13.05	33.58	
2003	0.5385	08.4%	4.52%	15.97	33.79	
2004	0.5115	07.9%	4.04%	16.95	34.26	
2005	0.4154	07.5%	3.12%	17.68	34.87	
2006	0.5459	10.6%	5.79%	18.59	35.19	
AVERAGE GROWTH			4.23%	9.50%		1.18%
2007	0.5385	09.5%	5.12%		35.70	1.45%
2008	0.5200	09.5%	4.94%		36.20	1.42%
2010-2012	0.4698	08.0%	3.76%	5.50%	37.70	1.39%

Data from Value Line Ratings and Reports, March 30, May 11, and June 1 2007.

HAWAIIAN ELECTRIC COMPANY

DCF GROWTH RATES
ELECTRIC UTILITIES

COMPANY	br	+	sv=g*(1-(1/(M/B)))		=	g
FE	6.50%	+	0.00%	(1 - (1/ 2.28)))	=	6.50%
NU	6.00%	+	2.00%	(1 - (1/ 1.64)))	=	6.78%
PGN	3.00%	+	1.75%	(1 - (1/ 1.57)))	=	3.64%
SO	4.00%	+	1.25%	(1 - (1/ 2.16)))	=	4.67%
LNT	5.00%	+	2.00%	(1 - (1/ 1.84)))	=	5.91%
AEE	4.00%	+	2.50%	(1 - (1/ 1.62)))	=	4.96%
AEP	5.50%	+	1.50%	(1 - (1/ 1.86)))	=	6.20%
CNL	5.00%	+	3.00%	(1 - (1/ 1.75)))	=	6.28%
DPL	6.50%	+	0.00%	(1 - (1/ 4.29)))	=	6.50%
EDE	3.50%	+	3.50%	(1 - (1/ 1.50)))	=	4.67%
ETR	7.50%	+	-1.00%	(1 - (1/ 2.76)))	=	6.86%
HE	3.75%	+	1.75%	(1 - (1/ 1.85)))	=	4.55%
PNM	6.00%	+	2.50%	(1 - (1/ 1.31)))	=	6.60%
PNW	4.75%	+	0.50%	(1 - (1/ 1.35)))	=	4.88%
UNS	6.00%	+	1.25%	(1 - (1/ 1.83)))	=	6.57%

Median Market-to-Book Ratio = 1.83

FE	=	FirstEnergy Corp.
NU	=	Northeast Utilities
PGN	=	Progress Energy
SO	=	Southern Company
LNT	=	Alliant Energy
AEE	=	Ameren Corp.
AEP	=	American Electric Power
CNL	=	Cleco Corporation
DPL	=	DPL, Inc.
EDE	=	Empire District Electric
ETR	=	Entergy Corp.
HE	=	Hawaiian Electric
PNM	=	PNM Resources
PNW	=	Pinnacle West Capital
UNS	=	Unisource Energy

g*= expected growth in number of shares outstanding

HAWAIIAN ELECTRIC COMPANY

GROWTH RATE COMPARISON
ELECTRIC UTILITIES

	DCF	Value Line Projected			Reuters	Value Line Historic			Reuters & VL	5-yr Compound Hist.		
COMPANY	Growth	EPS	DPS	BVPS	EPS	EPS	DPS	BVPS	AVGS.	EPS	DPS	BVPS
FE	6.50%	9.00%	5.50%	5.50%	7.00%	3.50%	4.00%	4.50%	5.57%	10.58%	6.24%	3.75%
NU	6.78%	12.00%	6.50%	3.50%	9.40%	0.00%	16.50%	3.00%	7.27%	5.33%	8.03%	1.75%
PGN	3.64%	3.00%	1.00%	1.50%	4.57%	-0.50%	2.50%	5.00%	2.44%	-6.12%	2.28%	2.43%
SO	4.67%	3.00%	4.00%	5.00%	4.57%	3.00%	2.00%	1.00%	3.22%	3.99%	3.30%	6.05%
LNT	5.91%	5.00%	5.50%	4.00%	5.67%	-3.00%	-11.50%	-2.50%	0.45%	16.20%	-8.68%	2.81%
AEE	4.96%	1.00%	0.00%	3.00%	7.50%	0.50%	0.00%	5.00%	2.43%	2.09%	0.00%	5.12%
AEP	6.20%	7.00%	7.50%	5.50%	5.06%	3.00%	-9.50%	-2.50%	2.29%	0.62%	-7.90%	3.86%
CNL	6.28%	4.00%	4.00%	6.50%	12.00%	1.00%	2.00%	4.00%	4.79%	-3.84%	0.00%	5.73%
DPL	6.50%	8.00%	7.50%	5.00%	9.00%	-1.00%	0.50%	-1.00%	4.00%	18.75%	2.04%	0.68%
EDE	4.67%	10.00%	1.50%	3.00%	3.00%	-5.00%	0.00%	2.00%	2.07%	1.78%	0.00%	1.61%
ETR	6.86%	7.50%	7.50%	6.50%	9.60%	10.00%	7.50%	4.50%	7.59%	8.56%	10.02%	2.23%
HE	4.55%	4.00%	0.00%	0.50%	4.88%	-1.00%	0.00%	2.00%	1.48%	-4.31%	0.00%	-0.87%
PNM	6.60%	4.50%	8.00%	5.50%	10.13%	-2.50%	7.50%	4.50%	5.38%	12.17%	10.52%	6.83%
PNW	4.88%	3.50%	4.00%	2.50%	6.75%	-5.00%	6.00%	4.00%	3.11%	3.47%	5.50%	3.73%
UNS	6.57%	6.50%	8.50%	5.50%	10.00%	1.50%	25.50%	9.50%	9.57%	14.99%	12.47%	8.80%
		5.87%	4.73%	4.20%		0.30%	3.53%	2.87%		5.62%	2.92%	3.63%
AVERAGES	5.70%		4.93%		7.28%		2.23%		4.11%		4.06%	

Zack's growth rates: FE-6%, NU-13%, PGN-4.4%, SO-4%, LNT-6.0%, AEE-6.7%, AEP-4.7%, CNL-12%, DPL-8.7%, EDE-n/a, ETR-10.8%, HE-4.9%, PNM-8.8%, PNW-6.7%, and UNS-10.0%. Zack's average earnings growth = 7.6%.

HAWAIIAN ELECTRIC COMPANY

STOCK PRICE, DIVIDENDS, YIELDS
ELECTRIC UTILITIES

COMPANY	AVG. STOCK PRICE 4/16/07-5/25/07 (PER SHARE)		ANNUALIZED DIVIDEND (PER SHARE)	DIVIDEND YIELD
FE	$70.14		$2.00	2.85%
NU	$32.41		$0.80	2.47%
PGN	$51.62		$2.44	4.73%
SO	$37.51		$1.61	4.50%
LNT	$44.56		$1.35	3.02%
AEE	$53.03		$2.54	4.79%
AEP	$49.68		$1.56	3.14%
CNL	$28.14		$0.90	3.20%
DPL	$31.32		$1.11	3.54%
EDE	$24.93		$1.28	5.13%
ETR	$115.73		$2.16	1.87%
HE	$25.81		$1.24	4.80%
PNM	$32.06	*	$0.88	2.93%
PNW	$48.72		$2.10	4.31%
UNS	$38.62		$0.96	2.48%
			AVERAGE	**3.58%**

* Dividend increased by (1+g), derived on DOD-208.

DOD-210
DOCKET NO. 06-0386

HAWAIIAN ELECTRIC COMPANY

DCF COST OF EQUITY CAPITAL
ELECTRIC UTILITIES

COMPANY	DIVIDEND YIELD Schedule 6	GROWTH RATE Schedule 5	DCF COST OF EQUITY CAPITAL
FE	2.85%	6.50%	9.35%
NU	2.47%	6.78%	9.25%
PGN	4.73%	3.64%	8.36%
SO	4.50%	4.67%	9.17%
LNT	3.02%	5.91%	8.94%
AEE	4.79%	4.96%	9.75%
AEP	3.14%	6.20%	9.34%
CNL	3.20%	6.28%	9.48%
DPL	3.54%	6.50%	10.04%
EDE	5.13%	4.67%	9.80%
ETR	1.87%	6.86%	8.73%
HE	4.80%	4.55%	9.36%
PNM	2.93%	6.60%	9.52%
PNW	4.31%	4.88%	9.19%
UNS	2.48%	6.57%	9.05%
		AVERAGE	**9.29%**
		STANDARD DEVIATION	**0.42%**

HAWAIIAN ELECTRIC COMPANY

CAPM COST OF EQUITY CAPITAL
ELECTRIC UTILITIES

$$k = rf + B\,(rm - rf)$$

[rf]* = 4.85%
[rm - rf]† = 5.00% (geometric mean)
[rm - rf]† = 6.50% (arithmetic mean)
average beta (Value Line) = 0.92

Value Line Beta
k = 4.85% + 0.92 (5.00%/6.50%)
k = 4.85% + 4.60%/5.98%
k = 9.45% /10.83%

*Current T-Bond yields, six-week average yield from Value Line Selection & Opinion (4/20/07-5/25/07, inclusive)
†Geometric and arithmetric market risk premiums from Morningstar 2006 SBBI Yearbook, p. 28.

HAWAIIAN ELECTRIC COMPANY
PROOF

If market price exceeds book value,
the market-to-book ratio is greater than 1.0,
and the earnings-price ratio understates the cost of capital.

MP = market price
BV = book value
i = cost of equity capital
r = earned return
E = earnings

1. At MP = BV, $i = r = \frac{E}{MP}$.
2. $E = rBV$.
3. Then, $\frac{E}{MP} = \frac{rBV}{MP}$.
4. When BV < MP, i.e., $\frac{BV}{MP} < 1$, then,
   a. $\frac{E}{MP} < r$, since $\frac{E}{MP} = \frac{rBV}{MP} < r$, because $\frac{BV}{MP} < 1$;
   b. $i < r$, since at $\frac{BV}{MP} = 1$, $i = \frac{E}{MP} = \frac{rBV}{MP}$, but if $\frac{BV}{MP} < 1$, then $i < r$; and
   c. $\frac{E}{MP} < i$, since at $\frac{BV}{MP} = 1$, $i = \frac{E}{MP} = \frac{rBV}{MP}$, but if $\frac{BV}{MP} < 1$, then $\frac{E}{MP} < i$, because,
      1) $\frac{BV}{MP} < 1$, through MP increasing, and, if so, $\frac{E}{MP}$ decreases, therefore, $\frac{E}{MP} < i$, or
      2) $\frac{BV}{MP} < 1$, through BV decreasing, and, if so, given $E = rBV$, $\frac{E}{MP}$ decreases, therefore, $\frac{E}{MP} < i$.
5. Ergo, $\frac{E}{MP} < i < r$, the earnings-price ratio is lower than the cost of capital, which is lower than the earned return.

HAWAIIAN ELECTRIC COMPANY

MODIFIED EARNINGS-PRICE RATIO ANALYSIS
ELECTRIC UTILITIES

COMPANY	Reuters 2008 Earnings (Per Share)	Market Price (Per share)	Earnings-Price Ratio	Current R.O.E. 2008	Projected R.O.E. 2010-2012
FE	$4.20	$70.14	5.99%	13.50%	13.50%
NU	$1.74	$32.41	5.37%	8.00%	8.00%
PGN	$3.03	$51.62	5.87%	9.00%	9.00%
SO	$2.30	$37.51	6.13%	13.00%	13.00%
LNT	$2.66	$44.56	5.97%	10.50%	9.50%
AEE	$3.73	$53.03	7.03%	9.50%	9.00%
AEP	$3.14	$49.68	6.32%	11.50%	12.50%
CNL	$1.67	$28.14	5.93%	8.00%	10.00%
DPL	$1.80	$31.32	5.75%	24.00%	18.50%
EDE	$1.53	$24.93	6.14%	9.50%	11.00%
ETR	$6.87	$115.73	5.94%	14.00%	13.00%
HE	$1.59	$25.81	6.16%	10.00%	12.00%
PNM	$2.27	$32.06	7.08%	8.00%	7.50%
PNW	$3.18	$48.72	6.53%	8.50%	8.50%
UNS	$2.42	$38.62	6.27%	9.50%	8.00%
		AVERAGE	6.16%	11.10%	
		CURRENT M.E.P.R.	**8.63%**		
		AVERAGE	6.16%		10.87%
		PROJECTED M.E.P.R.		**8.52%**	

HAWAIIAN ELECTRIC COMPANY

MARKET-TO-BOOK RATIO ANALYSIS
ELECTRIC UTILITIES

$k = R.O.E.(1-b)/(M/B) + g$
[2008]

COMPANY									MARKET-TO-BOOK COST OF EQUITY
FE	k= 13.5%	(1-	0.4881	)/	2.28	+	6.50%	=	9.53%
NU	k= 8.0%	(1-	0.4645	)/	1.64	+	6.78%	=	9.39%
PGN	k= 9.0%	(1-	0.1448	)/	1.57	+	3.64%	=	8.53%
SO	k= 13.0%	(1-	0.2783	)/	2.16	+	4.67%	=	9.01%
LNT	k= 10.5%	(1-	0.4731	)/	1.84	+	5.91%	=	8.92%
AEE	k= 9.5%	(1-	0.1672	)/	1.62	+	4.96%	=	9.83%
AEP	k= 11.5%	(1-	0.4452	)/	1.86	+	6.20%	=	9.62%
CNL	k= 8.0%	(1-	0.3077	)/	1.75	+	6.28%	=	9.45%
DPL	k= 24.0%	(1-	-0.0286	)/	4.29	+	6.50%	=	12.25%
EDE	k= 9.5%	(1-	0.2242	)/	1.50	+	4.67%	=	9.58%
ETR	k= 14.0%	(1-	0.5966	)/	2.76	+	6.86%	=	8.91%
HE	k= 10.0%	(1-	0.1143	)/	1.85	+	4.55%	=	9.34%
PNM	k= 8.0%	(1-	0.4769	)/	1.31	+	6.60%	=	9.78%
PNW	k= 8.5%	(1-	0.2806	)/	1.35	+	4.88%	=	9.42%
UNS	k= 9.5%	(1-	0.5200	)/	1.83	+	6.57%	=	9.06%
								AVERAGE	**9.51%**
								STANDARD DEVIATION	**0.84%**

Note: Equity returns and retention ratios based on Value Line current year projections.

HAWAIIAN ELECTRIC COMPANY

MARKET-TO-BOOK RATIO ANALYSIS
ELECTRIC UTILITIES

$k = R.O.E.(1-b)/(M/B) + g$
[2010-2012]

COMPANY									MARKET-TO-BOOK COST OF EQUITY
FE	k= 13.5%	(1-	0.5238	)/ 2.28	+	6.50%	=		9.32%
NU	k= 8.0%	(1-	0.4556	)/ 1.64	+	6.78%	=		9.44%
PGN	k= 9.0%	(1-	0.2125	)/ 1.57	+	3.64%	=		8.15%
SO	k= 13.0%	(1-	0.2600	)/ 2.16	+	4.67%	=		9.12%
LNT	k= 9.5%	(1-	0.4582	)/ 1.84	+	5.91%	=		8.71%
AEE	k= 9.0%	(1-	0.2063	)/ 1.62	+	4.96%	=		9.36%
AEP	k= 12.5%	(1-	0.4500	)/ 1.86	+	6.20%	=		9.88%
CNL	k= 10.0%	(1-	0.3143	)/ 1.75	+	6.28%	=		10.21%
DPL	k= 18.5%	(1-	0.3684	)/ 4.29	+	6.50%	=		9.22%
EDE	k= 11.0%	(1-	0.3600	)/ 1.50	+	4.67%	=		9.36%
ETR	k= 13.0%	(1-	0.5445	)/ 2.76	+	6.86%	=		9.01%
HE	k= 12.0%	(1-	0.2914	)/ 1.85	+	4.55%	=		9.15%
PNM	k= 7.5%	(1-	0.4049	)/ 1.31	+	6.60%	=		9.99%
PNW	k= 8.5%	(1-	0.2515	)/ 1.35	+	4.88%	=		9.61%
UNS	k= 8.0%	(1-	0.4698	)/ 1.83	+	6.57%	=		8.89%
								AVERAGE	**9.29%**
								STANDARD DEVIATION	**0.52%**

Note: Equity returns and retention ratios based on Value Line three- to five-year projections.

HAWAIIAN ELECTRIC COMPANY
OVERALL COST OF CAPITAL

Type of Capital	PERCENT [1]	COST RATE [2]	WT. AVG. COST RATE [3]=[1]x[2]
1) Common Equity	52.01%	9.25%	4.81%
2) Preferred Stock	1.82%	5.51%	0.10%
3) Hybrid Securities	2.58%	7.47%	0.19%
4) Long-term Debt	37.87%	6.09%	2.31%
5) Short-term Debt	5.72%	5.00%	0.29%
6) Totals	100.00%		**7.70%**

PRE-TAX INTEREST COVERAGE* = 4.23x

*Assuming the Company experiences, prospectively, a combined income tax rate of 40%, the pre-tax overall return would be 10.97% [7.70%-(0.19%+2.31%+ 0.29%)=4.91%/(1-40%) =8.17%+(0.19%+2.31%+0.29%)]. That pre-tax overall return (10.97%), divided by the weighted cost of debt (2.60%), indicates a pre-tax interest coverage level of 4.23 times.

HAWAIIAN ELECTRIC COMPANY
BOND RATING BENCHMARK ESTIMATE
BASED ON DOD RECOMMENDED 9.25% ROE

	Description	($000)	Reference
1	Rate Base	$1,160,000	DOD-103, p. 1
2	Wt. Return on Equity	4.810%	DOD-215, p. 1, line 1, column 3.
3	Income to Common	$55,796	Line 1 x line 2.
4	Depreciation & Amort.	$78,763	DOD-IR-95 / HECO June 2007 update
5	Deferred Income Tax	($11,157)	Estimated from HECO-1505, June 2007 update.
6	Funds From Operations	$123,402	Line 3 + line 4 + line 5
7	Weighted Interest Rate	2.785%	DOD-215, p. 1, column 3, line 3+4+5.
8	Interest Expense	$47,293	Line 1 x line 7+ PP Int. Exp. (HECO-WP-1913).
9	FFO + Interest	$170,695	Line 6 + line 8.
10	**FFO Interest Coverage**	**3.6**	Line 9 ÷ line 8.
11	**Effective Debt Ratio**	**55.51%**	DOD-205, p. 1; HECO-WP-1913, p. 11.
12	**FFO to Total Debt**	**19%**	Line 6 ÷ (Line 1 x line 11)

	S&P "BBB" Rating Bus. Pos. = 5
FFO Interest Coverage	2.8x-3.8x
Debt Ratio	50%-60%
FFO to Total Debt	15%-22%

Standard & Poor's, "Assessing U.S. Vertically Integrated Utilities' Business Risk Drivers," September 14, 2006.

CERTIFICATE OF SERVICE

I hereby certify that one copy of the foregoing DIRECT TESTIMONY OF STEPHEN G. HILL was duly served upon the following parties, by personal service, hand-delivery, and/or U.S. mail, postage prepaid, and properly addressed pursuant to HAR sec. 6-61-21(d).

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